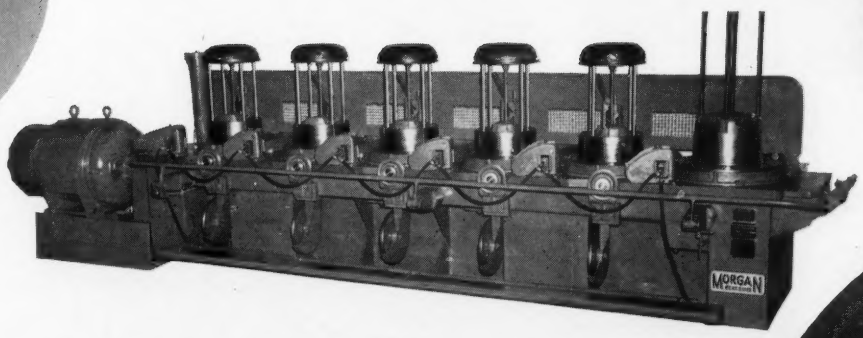
WIRE AND WIRE PRODUCTS

DECEMBER 1952

Wishing you
A Very Merry Christmas

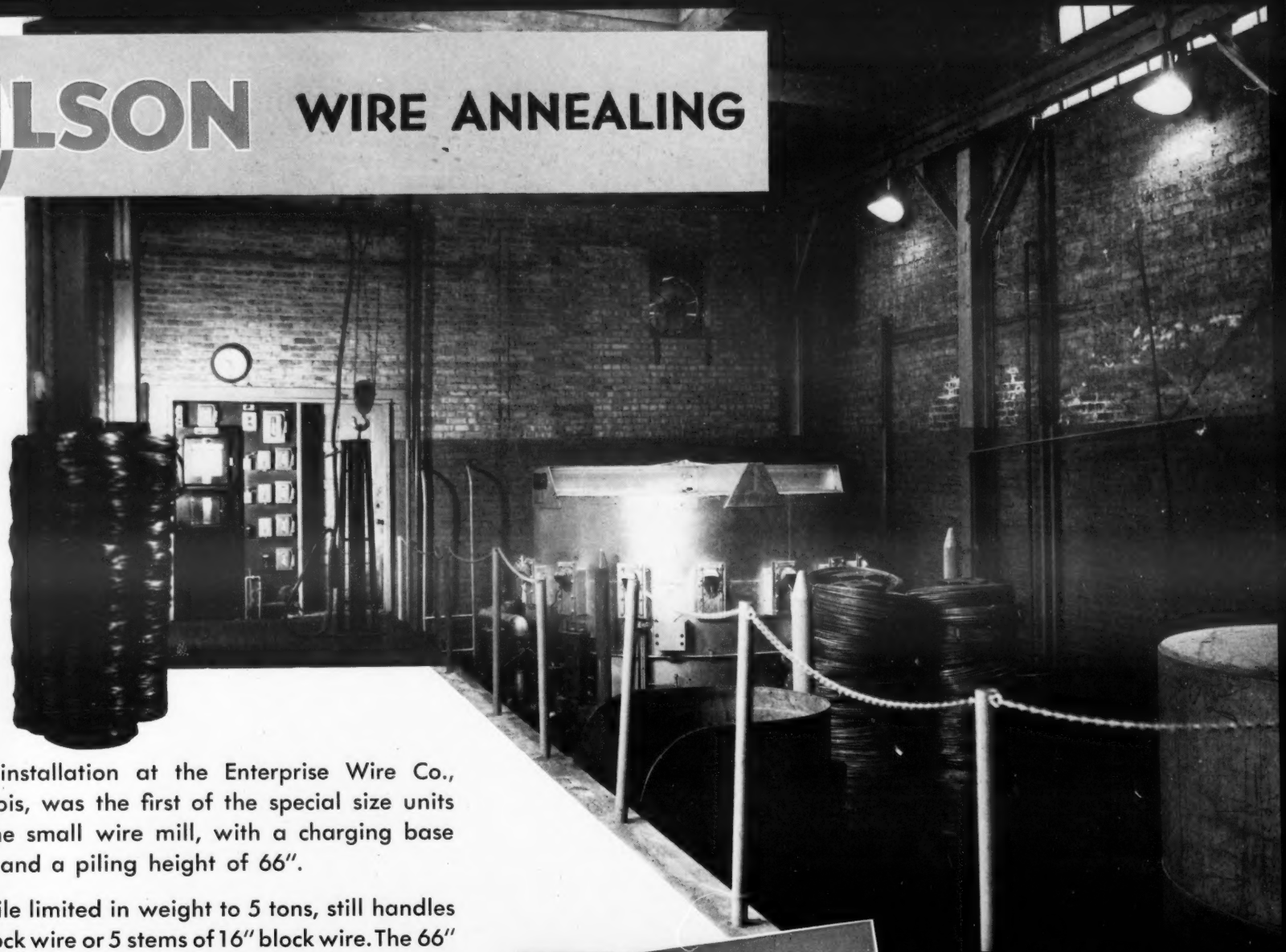


***MORGAN-CONNOR** Wire Machines*
Morgan Construction Company
Worcester, Mass.

WM69

OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION

WILSON WIRE ANNEALING



This annealing installation at the Enterprise Wire Co., Blue Island, Illinois, was the first of the special size units developed for the small wire mill, with a charging base 62" in diameter and a piling height of 66".

This furnace, while limited in weight to 5 tons, still handles 3 stems of 22" block wire or 5 stems of 16" block wire. The 66" charge height materially reduces the head room required.

Large enough for bulk orders and small enough for high quality and diversity, this unit has been widely adapted to the smaller plants in the wire industry.

Lee Wilson ENGINEERING Co., Inc.
20005 WEST LAKE ROAD • CLEVELAND, OHIO
Telephone ED-1-6600

R-272

Production performance of Firthaloy rough cored dies for wire, bar and tube drawing is assured by continuous research . . . precision molding . . . controlled sintering . . . a rugged forged casing to withstand extreme drawing pressures . . . and a preformed back relief that lasts the life of the die, minimizing the cost of finishing and recutting.

Firth Sterling INC.

OFFICES* AND WAREHOUSES: HARTFORD NEW YORK* DETROIT CLEVELAND DAYTON* PITTSBURGH* CHICAGO BIRMINGHAM* LOS ANGELES PHILADELPHIA*

GENERAL OFFICES: 3113 FORBES ST., PITTSBURGH 30, PA.

Canadian Distributor—Chapat Engineering & Sales, Ltd.

We make them all

Perhaps not one of these identification tags describes the kind of steel wire that's best for your requirements. Although there are countless applications for the common types of wire, more and more specialty grades are being used today. These have been developed with specific end uses in mind. They have properties that help wire processors to cut production costs and to improve the performance and sales appeal of wire products.

Your own uses may call for one of our standard grades or a special-purpose type of steel wire. Either way, you can count on our paying strict attention to the important details in turning out a top-quality product in our modern wire mills.

In just the past few years we have made real strides forward in perfecting various specialties in steel wire. Perhaps you'd be interested in some of these. Our engineers will be glad to contribute their experience to any problems you may have in the selection and processing of steel wire.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributors* Bethlehem Steel Export Corporation

BETHLEHEM WIRE

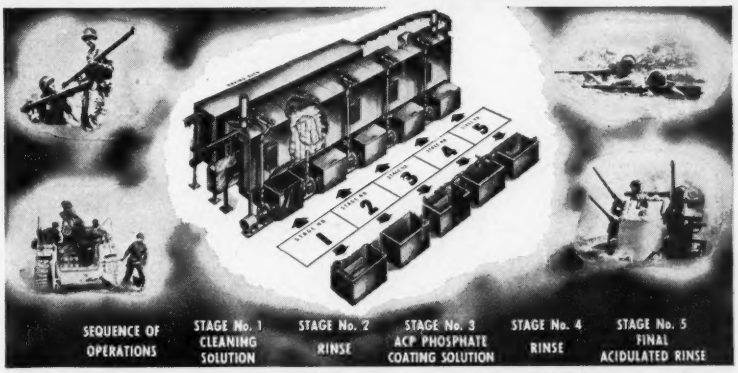
BETHLEHEM STEEL

AMERICAN CHEMICAL PAINT COMPANY

AMBLER CHEMICALS ACP PROCESSES PENNA.

Technical Service Data Sheet
Subject: METAL PRESERVATION AND PAINT PROTECTION WITH ACP PHOSPHATE COATING CHEMICALS

Typical spray and dip phosphating equipment and some ordnance products that are now given a protective phosphate coating for extra durability under all kinds of severe exposure conditions. Both military and civilian applications of ACP phosphate coating chemicals are shown in the chart below.


SEQUENCE OF OPERATIONS
STAGE No. 1 CLEANING SOLUTION
STAGE No. 2 RINSE
STAGE No. 3 ACP PHOSPHATE COATING SOLUTION
STAGE No. 4 RINSE
STAGE No. 5 FINAL ACIDULATED RINSE

U.S. ARMY PHOTOGRAPHS COURTESY OF "ORDNANCE MAGAZINE"

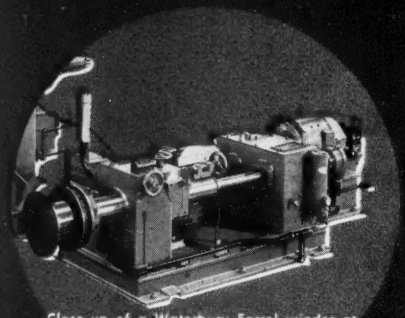
SELECTION CHART OF ACP PROTECTIVE COATING CHEMICALS FOR STEEL, ZINC, AND ALUMINUM

METAL	ACP CHEMICAL	OBJECT OF COATING	TYPICAL METAL PRODUCTS TREATED	GOVERNMENT SPECIFICATIONS
STEEL	"GRANODINE" Zinc Phosphate Coating Chemical	Improved paint adhesion	Steel, iron, or zinc fabricated units or components, automobile bodies, refrigerators, washing machines, cabinets, etc.; projectiles, rockets, bombs, rifles, small arms, belt links, cartridge tanks, vehicular sheet metal, tank bolts and links, recoilless guns, etc.	MIL-S-5002 JAN-C-490, Grade 1 JAN-F-495 U.S.A. 57-0-2, Type II, Class C U.S.A. 51-70-1, Finish 22.02, Class C U.S.A. 50-60-1 16 E4 (Ships)
STEEL	"PERMADINE" Zinc Phosphate Coating Chemical	Rust and corrosion prevention	Nuts, bolts, screws, hardware items, tools, guns, cartridge clips, fire control instruments, metallic belt links, steel aircraft parts, certain steel projectiles and many other components.	MIL-C-16232 U.S.A. 57-0-2, Type II, Class B U.S.A. 51-70-1, Finish 22.02, Class B Navy Aeronautical M-364 U.S.A. 72-53 (See An-F-20)
STEEL	"THERMOIL-GRANODINE" Manganese-iron Phosphate Coating	Wear-resistance anti-galling, safe break-in of friction or rubbing parts. Rust proofing.	Friction surfaces such as pistons, piston rings, gears, cylinder liners, camshafts, tappets, crankshafts, rocker arms, etc. Small arms, weapon components. Hardware items, etc.	MIL-C-16232 U.S.A. 57-0-2, Type II, Class A U.S.A. 51-70-1, Finish 22.02 Class A Navy Aeronautical M-364 U.S.A. 72-53 (See AN-F-20)
STEEL	"GRANODRAW" Zinc-iron Phosphate Coating	Improved drawing, extrusion, and cold forming	Blanks and shells for cold forming, heavy stampings; tubs; tubing for forming or drawing; wire; rod; etc.	———
ALUMINUM	"ALODINE" Protective Coating	Improved paint adhesion and corrosion resistance	Aluminum products of similar design such as refrigerator parts, wall tile, signs, washing machine tubs, etc; aircraft and aircraft parts; bazookas (rocket launchers), helmets, belt buckles, clothes dryers, clothesline, rocket motors, etc., aluminum strip or sheet stock.	MIL-C-5541 (See also QPL-5541-1) MIL-S-5002 AN-F-20 U.S. Navord O.S. 675 16 E4 (Ships) AN-C-170 (See MIL-C-5541) U.S.A. 72-53 (See AN-F-20)
ZINC	"LITHOFORM" Zinc Phosphate Coating Chemical	Improved paint adhesion	Zinc alloy die castings; zinc or cadmium plated sheet or components; hot dip galvanized stock; galvanneal; signs; siding; roofing; galvanized truck bodies; etc.	QQ-P-416 RR-C-82 JAN-F-495 AN-F-20 U.S.N. Appendix 6 U.S.A. 72-53 (See AN-F-20)

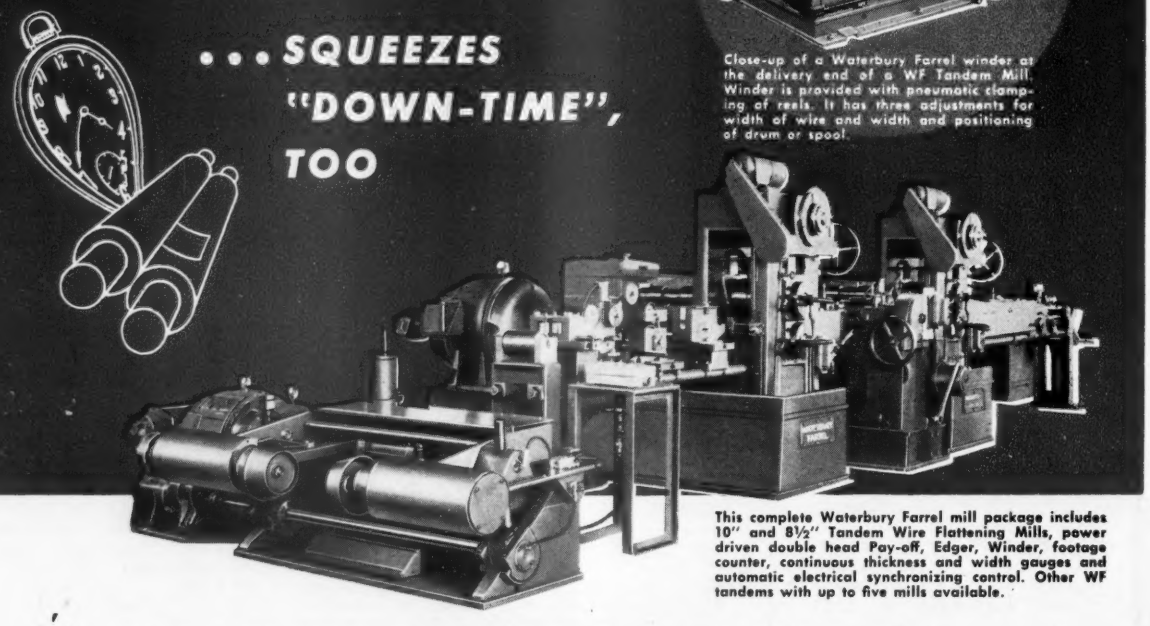
CHEMICALS ACP PROCESSES **WRITE FOR DESCRIPTIVE FOLDERS ON THE ABOVE CHEMICALS AND FOR INFORMATION ON YOUR OWN METAL PROTECTION PROBLEMS** CHEMICALS ACP PROCESSES

THIS WF WIRE FLATTENING TEAM

. . . SQUEEZES "DOWN-TIME", TOO



Close-up of a Waterbury Farrel winder at the delivery end of a WF Tandem Mill. Winder is provided with pneumatic clamping of reels. It has three adjustments for width of wire and width and positioning of drum or spool.



This complete Waterbury Farrel mill package includes 10" and 8½" Tandem Wire Flattening Mills, power driven double head Pay-off, Edger, Winder, footage counter, continuous thickness and width gauges and automatic electrical synchronizing control. Other WF tandems with up to five mills available.

Modern Waterbury Farrel Mill Design Insures High Production Plus Precision . . . Minimizes "Down-Time"

Here are some reasons why Waterbury Farrel Wire Flattening equipment can give you *more continuous,* high speed, precision production.

- Loading payoff and motor driven screwdowns for mills and edgers facilitate threading of wire with minimum effort and time.
- To protect precision operation, soluble oil is circulated internally and externally on the rolls and into coolant enclosures where wire is submerged. A refrigeration system maintains the coolant oil temperature at approximately 70° while a flotation unit keeps it clean and fresh. In addition, high speed mills also have a self-contained, automatically-filtered circulating mineral oil lubrication system for roll necks and drives.
- Transparent lucite covers at vital lubrication points such as gear cases and universal joints make it easy to check lubrication at a glance.
- Anti-friction bearings are used for all rotating members including the winder shaft. High precision anti-friction bearings are used on roll necks and edger arbors. This, combined with precision fitting of component parts enables WF mills to maintain tolerances well inside commercial allowance.
- Tungsten carbide ring rolls permit rolling the toughest alloys and increase roll life.
- Electric control keeps wire tension constant. Dancer rolls are used for fine wire.

Waterbury Farrel designs and builds a wide range of wire flattening mill equipment to suit specific requirements. Various sizes and combinations of single and multiple mill stands with auxiliary equipment are available for flattening ferrous and non-ferrous wire from the smallest diameters to 1" diameter and more. Speeds range up to and above 2500 FPM.

Write for further information.

WATERBURY FARREL FOUNDRY & MACHINE CO.
WATERBURY 20, CONN.
***Sales Offices:* Chicago, Cleveland, Millburn, N. J.**

WATERBURY FARREL FOUNDED 1851

A FEW OF THE MANY TYPES OF METAL WORKING MACHINERY MADE BY WATERBURY FARREL

MILL MACHINERY—Rolling Mills: Strip, Rod, Wire Flattening, (For Ferrous and Non Ferrous Metals) • Also Slitters • Straighteners • Cut-off Saws • Coilers • Winders, etc. *WIRE MILL EQUIPMENT*—Continuous Wire Drawing Machines (Upright Cone and Tandem) • Wire Flattening Mills • Chain Draw Benches • Pointers Swagers • Bull Blocks • String-up Machines • Spoolers, etc. *COLD PROCESS BOLT & NUT MACHINERY*—Headers (all types) • Rivet Machinery • Trimmers • Thread Rolling Machines • Slotters • Nut Formers and Tappers, etc. *POWER PRESSES*—Crank, Cam and Toggle; also Rack and Pinion Presses • Eyelet Machines Multiple Plunger Presses • Horizontal and Hydraulic Presses, etc.

WIRE AND WIRE PRODUCTS

Reg. U. S. Pat. Off.

A monthly publication devoted to the production of Wire, Rod and Strip, Wire and Rod Products and Insulated Wire and Cable.

DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 27 December, 1952 No. 12

Designated as Official Publication By The Wire Association

Contents

Editor's Desk 1279

Organized Cost Reduction
by Paul V. Crooks 1281

The Use of Crystallography in the Development and Manufacture of Diamond Tools
by G. E. Shubrooks and H. P. Gifford 1288

Silver Wire—Its Cold Working and Annealing
by M. Baliki 1291

Discussion of Aluminum Conductor Connectors
by H. W. Biskeborn 1297

Cold Pressure Welding of Wire
by Edmund D. Sickels 1298

Government Wire Production Information 1302

Outstanding Personalities of the Wire Industry 1309

A Review of Recent Wire Patents 1317

Index to Advertisers 1349

Where-to-Buy 1350-1353

Index to Editorial Contents 1952 1354-1355

Index to Authors 1952 1355-1356

WIRE and WIRE PRODUCTS is indexed regularly by Engineering Index, Inc., New York, N. Y.

RICHARD E. BROWN, President and Publisher

R. S. Spengel, Secy.-Treas. & Gen'l. Manager
J. Edward Donnellan, Vice-President

Edmund D. Sickels, Editor

— ASSOCIATE EDITORS —
Lancaster, Allwin & Rommel, Consultants on Patent Information

Publication Office: Orange, Conn.
Executive Office: 453 Main St., Stamford, Conn.

*Reg. U. S. Pat. Off.

WIRE & WIRE PRODUCTS, Vol. 27, No. 12 December, 1952. Publication Office at Orange, Conn. Executive Office 453 Main Street, Stamford, Conn. Published monthly by the Quinn-Brown Publishing Corp., Richard E. Brown, President; R. S. Spengel, Sec'y. and Treas. Subscription price: U. S. $5.00; Canada, $5.00 per year; 50 cents per copy, except October Convention Issue and January Convention Proceedings Issue, $1.00 per copy; Foreign $7.50 per year. Entered as second class matter, at the Post Office, Orange, Conn., under the act of March 3, 1879.

Copyright, 1952, Quinn-Brown Publishing Corp.

NILES

FLANGED STEEL TRAVERSES

. . . offer wire rope users and manufacturers rugged construction, simple 4-step reel assembly and long life—the same qualities that have made them first choice of thousands for wire and cable reels.

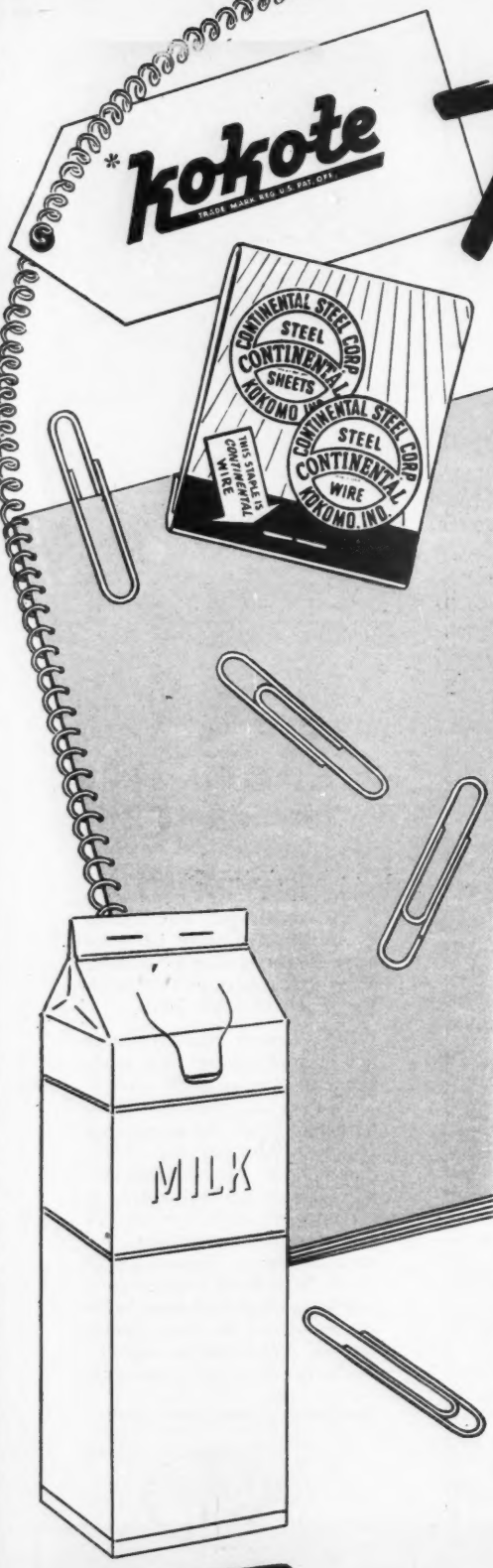
Niles Flanged Steel Traverses are manufactured in a wide range of sizes up to 56" diameter and 48" traverse... in plain, painted and hot dip galvanized finishes. The special "Reinforced Type" has *extra strength* where it is needed most—at bolt holes and base of the flange—yet saves weight through use of lighter gauge steel. Width of flange and number of bolt and drain holes are furnished to your specifications. Available for prompt delivery. Write for prices.

• • •

Manufactured Under License Arrangements With Western Electric Co., Inc.

REPUBLIC STEEL

REPUBLIC STEEL CORPORATION
PRESSED STEEL DIVISION
NILES, OHIO



Tough to Match...

IN ANY WIRE-BUYER'S BOOK

● Kokote just can't be beat . . . when it comes to brightness. It's a wire that's "different" from furnace to finish. Bright and lustrous as polished silver, Continental Kokote lends its chrome-like lustre to a wide variety of finished products. Our customers use it for spiral bindings, paper clips, match book staples and on milk cartons. There are a host of other uses for this flexible bright wire. And with Kokote, as with any Continental wire, users get Continental follow-through wire service. It's a basic Continental policy that the wire must be right for your particular product application—or it's made right. Write Continental at Kokomo, Indiana.

Trade Marks Reg. U.S. Pat. Off.

CONTINENTAL STEEL

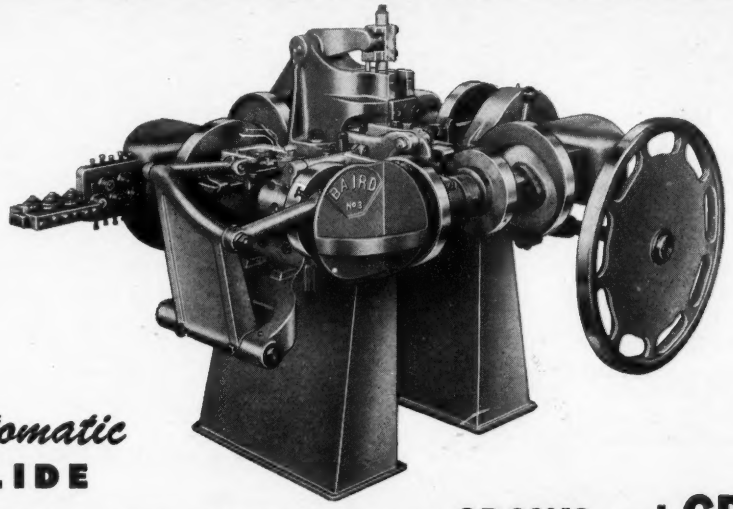
CONTINENTAL STEEL CORPORATION

GENERAL OFFICES • KOKOMO, INDIANA

PRODUCERS OF *Manufacturer's Wire* in many sizes, shapes, tempers and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, Lead Coated, and special wire. ALSO, Coated and Uncoated Steel Sheets, Nails, Continental Chain Link Fence, and other products.

ASK BAIRD ABOUT IT!

HIGH PRODUCTION TOOLING



BAIRD *Automatic* FOUR SLIDE

. . . the Machine that GROWS and GROWS and GROWS

Start, if you wish, with the standard (stocked) 4-slide, which in itself is remarkably versatile in forming hundreds of articles from wire and ribbon metal.

Then when conditions demand . . . a call for even greater versatility of production or a change in certain products . . . you may add one or more attachments to the standard model, so designed that "machine growth" is simplified and practical.

Thus, with gradual investments, you will build your Baird 4-slide to a full production unit capable of turning out the widest variety of wire and ribbon products. Here is a list of attachments easily added . . . but naturally, not all on one machine . . . as they might become too complicated.

1 **Horizontal Press Attachments**

2 **Form Raising Attachment**

3 **Pin Pulling Attachment**

4 **Round Wire and Ribbon Metal Rings**
(Simple, practical tooling available)

5 **Secondary Cut-Off Attachment**

6 **Pinch Pointing — Nail Pointing**
(Tooling to suit work and wire specifications)

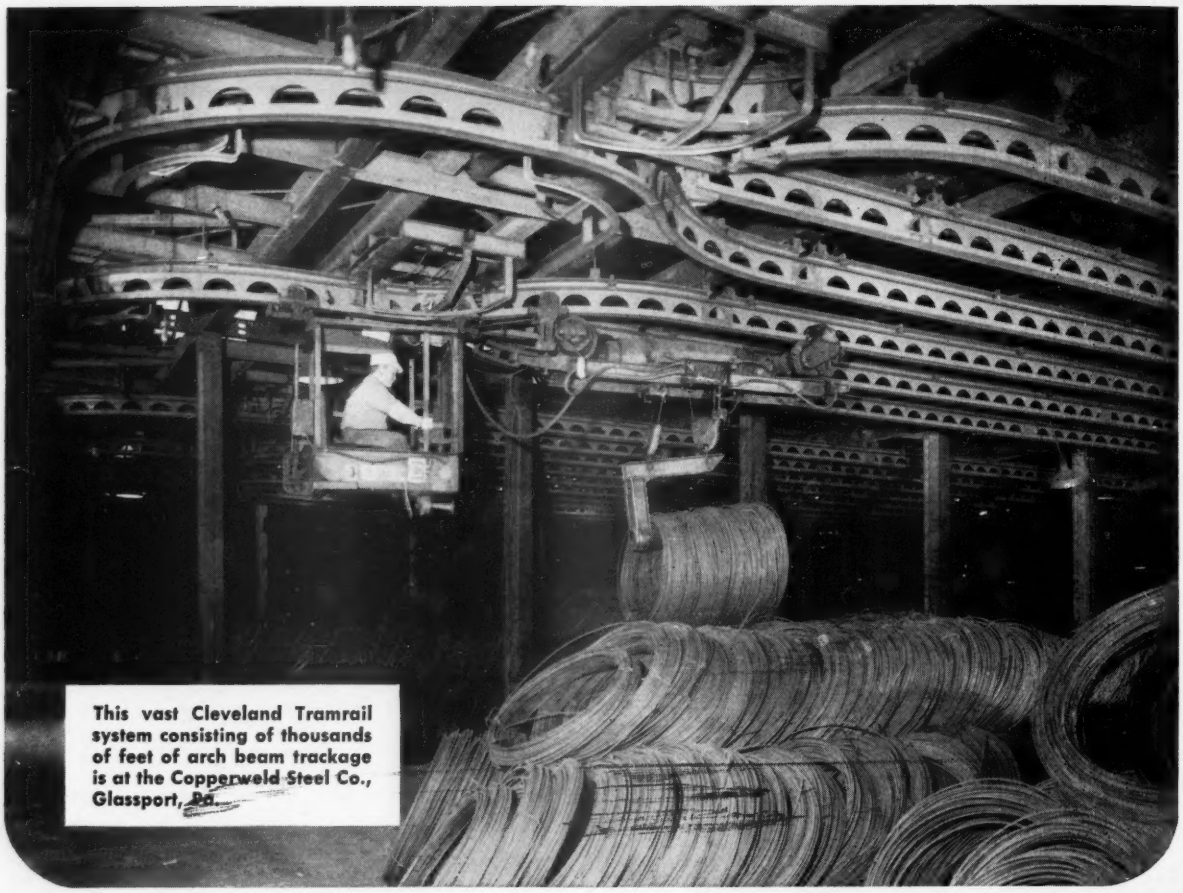
7 **Vertical Forming and Stripping**
(New patented Baird mechanism for this work)

Baird engineers will gladly develop tooling from your parts or specification. "Ask Baird about it!"

the BAIRD MACHINE COMPANY
STRATFORD • CONNECTICUT

AUTOMATIC MACHINE TOOLS • AUTOMATIC WIRE & RIBBON METAL FORMING MACHINES • AUTOMATIC PRESSES • TUMBLING BARRELS

48A52



This vast Cleveland Tramrail system consisting of thousands of feet of arch beam trackage is at the Copperweld Steel Co., Glassport, Pa.

The *Most Practical* and *Lowest Cost* Method of Handling Wire and Rod

The headline words refer to overhead materials handling equipment and are powerfully strong, we admit. Yet we do not know of one engineer who is closely connected with the industry and experienced with all methods of handling, who will disagree.

Mills, large and small, from coast to coast, in the United States and Canada, have invested many millions of dollars in Cleveland Tramrail equipment to speed their wire and rod handling. The dividends that this huge investment has made possible, because of low-cost handling, have returned the original capital many times over.

If your company does not now enjoy the many benefits of Cleveland Tramrail, we urge you to get the "low-down" on what this equipment can do for you. A nearby sales engineer will be glad to give you the details without obligation.

GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
9218 East 288th St., Wickliffe, Ohio

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

Pathfinders for your SPECIFIC JOBS

In addition to the three standard Pathfinders which we offer to cover the steel wire industry's normal needs (brief details below) we make machines of this type to fulfil your SPECIFIC requirements.

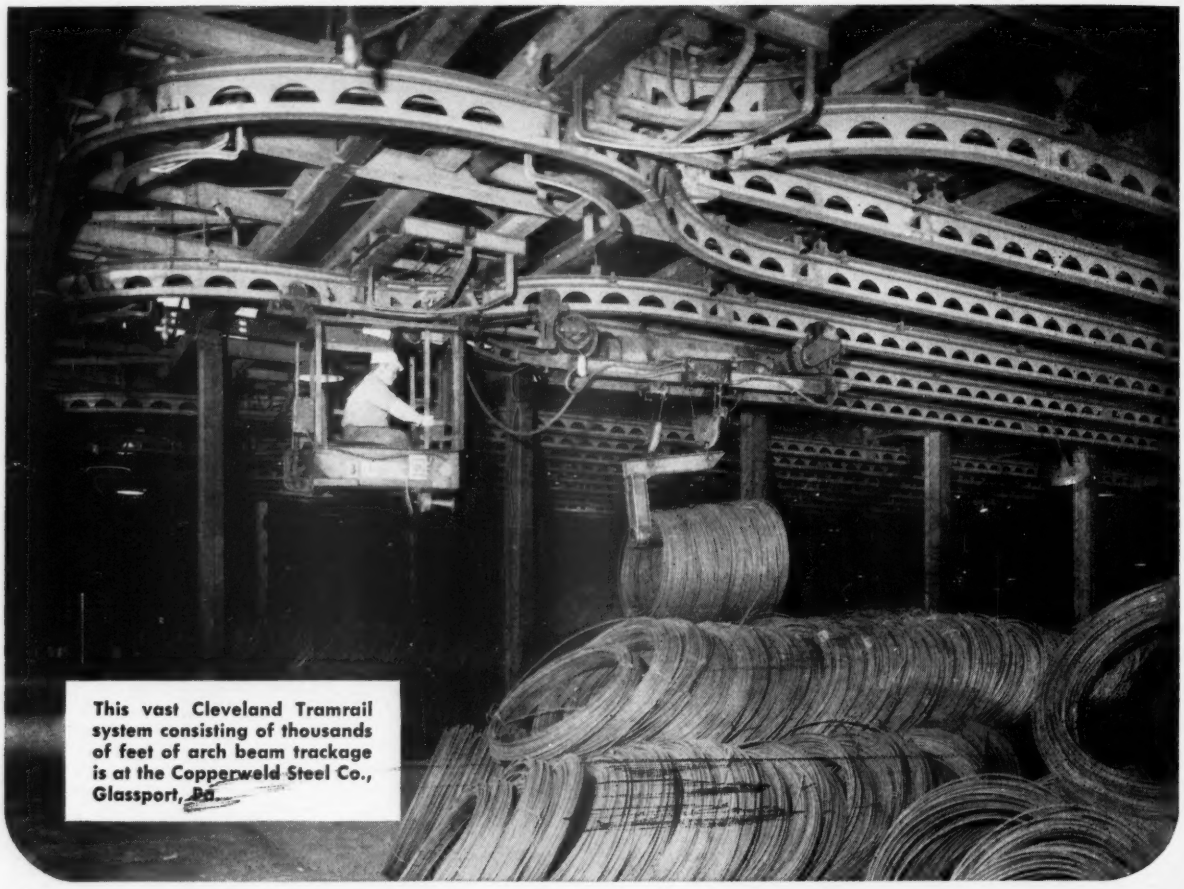
An interesting example is shown here: it was made to draw very high grade rope wire from patented inlets of .375″ diameter through eight dies, finishing with a light draft to ensure good torsional qualities. The speed range on the last block is 400 to 1200 feet per minute.

THE STANDARD PATHFINDERS			
	Type 30/60	Type 22/40	Type 22/30
No. of Blocks	5	6	6
Block Diameter	30″	22″	22″
Max. Inlet (High Carbon)...	.500″	.312″	.220″
Approx. finished size range	.250″ — .120″	.144″ — .080″	.120″ — .064″
Finishing speed range at full H.P.	450 — 1100 ft/min.	700 — 1400 ft/min.	800 — 1600 ft/min.

MARSHALL RICHARDS MACHINE CO. INC.

1100 SOUTH BROAD STREET · TRENTON 10 · NEW JERSEY
TELEPHONE: TRENTON 6-9478 . TELEGRAMS: MARICH TRENTON

M.R.71



This vast Cleveland Tramrail system consisting of thousands of feet of arch beam trackage is at the Copperweld Steel Co., Glassport, Pa.

The *Most Practical* and *Lowest Cost* Method of Handling Wire and Rod

The headline words refer to overhead materials handling equipment and are powerfully strong, we admit. Yet we do not know of one engineer who is closely connected with the industry and experienced with all methods of handling, who will disagree.

Mills, large and small, from coast to coast, in the United States and Canada, have invested many millions of dollars in Cleveland Tramrail equipment to speed their wire and rod handling. The dividends that this huge investment has made possible, because of low-cost handling, have returned the original capital many times over.

If your company does not now enjoy the many benefits of Cleveland Tramrail, we urge you to get the "low-down" on what this equipment can do for you. A nearby sales engineer will be glad to give you the details without obligation.

GET THIS BOOK!
BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
9218 East 288th St., Wickliffe, Ohio

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

Pathfinders for your SPECIFIC JOBS

In addition to the three standard Pathfinders which we offer to cover the steel wire industry's normal needs (brief details below) we make machines of this type to fulfil your SPECIFIC requirements.

An interesting example is shown here: it was made to draw very high grade rope wire from patented inlets of .375″ diameter through eight dies, finishing with a light draft to ensure good torsional qualities. The speed range on the last block is 400 to 1200 feet per minute.

THE STANDARD PATHFINDERS			
	Type 30/60	Type 22/40	Type 22/30
No. of Blocks	5	6	6
Block Diameter	30″	22″	22″
Max. Inlet (High Carbon) ...	.500″	.312″	.220″
Approx. finished size range	.250″ — .120″	.144″ — .080″	.120″ — .064″
Finishing speed range at full H.P.	450 — 1100 ft/min.	700 — 1400 ft/min.	800 — 1600 ft/min.

MARSHALL RICHARDS MACHINE CO. INC.

1100 SOUTH BROAD STREET · TRENTON 10 · NEW JERSEY
TELEPHONE: TRENTON 6-9478 . TELEGRAMS: MARICH TRENTON

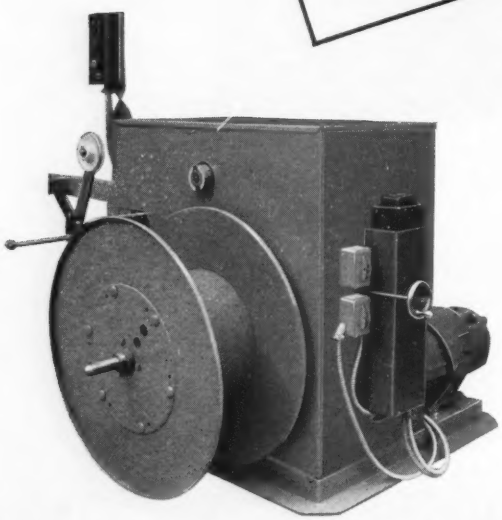
M.R.71

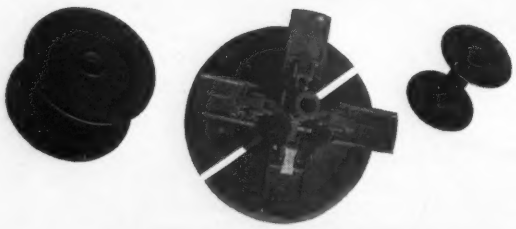
Now!

INTRODUCING

THE COMBINATION MACHINE LONG AWAITED BY THE WIRE INDUSTRY —ELECTRONICALLY CONTROLLED—

THE
DAVIS REELER AND RE-SPOOLER





THE NEW DAVIS REELER AND RE-SPOOLER

is equipped with a Davis predetermined counter for recording production. Stops automatically at any selected footage. A tachometer can also be furnished to indicate speeds.

This new combination machine, designed and developed as a result of Davis engineering research, is the last word in efficient and economical production. Of all welded steel construction, the combination is rugged, precision made and vibrationless.

Designed for use with the completely automatic DAVIS SPARK TESTING EQUIPMENT with your tinning or other present equipment. Adapted for use with any type collapsible coiling head up to 30″ diam.

EXCLUSIVE DESIGN FEATURES

1. Top re-spooling shaft is interchangeable to accomodate ⅝″ up to 1½″ diameter shafts—or to your specifications. Reel diameter 2″ to 18″. **Shafts can be interchanged in a matter of seconds.**
2. Lower or take-up shaft is also interchangeable. Sizes are standard—1¼″ or 1½″ diam.—or as you may specify. Reels up to 30″ diameter accomodated on this shaft.
3. Traverse, with variable speed control for all wire sizes, syncronizes with shaft speeds. Traverse width adjustable up to 16″.
4. Constant wire winding speeds over a 10—1 range. Maximum speed, 1200 FPM, but higher speeds available. Speed changes easily made through accessible controls.
5. New ELECTRONIC CONTROLLER starts machine with low torque factor. Avoids stretching and/or breaking of wire.
6. Electric disc brake of 10 to 25 lbs. will be furnished according to your requirements.
7. Safety cap provided for the idler shaft.
8. Constant footage device supplied if desired.

You are invited to get the facts on this remarkable machine

DAVIS EQUIPMENT

DAVIS ELECTRIC CO. WALLINGFORD, CONN., U.S.A.

HARNESS TESTERS • PAY-OFFS • TRAVERSES

SPARK TESTERS • SPOOLERS • TAKE-UPS • CAPSTANS

to the friends we've made

and the ones we hope to make—

a very

MERRY CHRISTMAS

— and a prosperous New Year!

Steelskin LUBRICANTS

R. H. MILLER

Company, Inc., Homer 1, N. Y.

TODAY - it's ESSENTIAL to...

KEEP INFORMED!

...with these descriptive

SYNCRO BULLETINS

designed to help YOU •

- evaluate your present Wire Drawing Machinery installations
- augment your existing machinery facilities to meet increased mobilization demands

SYNCRO MACHINE COMPANY

Machinery for the Wire Industry

PERTH AMBOY • NEW JERSEY • USA

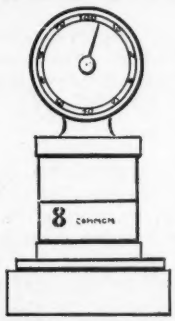
AFFILIATED COMPANY
WINGET-SYNCRO, LTD.
ROCHESTER, KENT, ENGLAND

It's easier to ship nails in

INTERNATIONAL'S keg-it

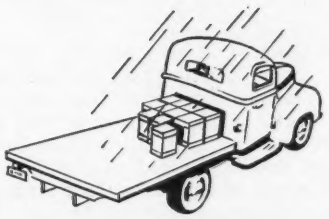
The sturdy, square shape fills rapidly, palletizes easily and, because of its smaller size, is easier to ship by truck, freight car or barge.

We're shipping the *3rd* million of these new low-cost fibre packages to nail manufacturers from our nearby factories. The KEG-IT is more efficient and easier to use in assembly, at the shakers, in your warehouse or on a construction job. If you'll write us, we'll be glad to show you what the KEG-IT can do for you.



LESS WEIGHT
. . . weighs 3 to 4 pounds less—cuts freight costs.

SMALLER SIZE
. . . up to 30% savings in space.



BETTER PROTECTION
. . . stands up in wet weather due to tough wood fibre construction and water-resistant adhesive.

International Paper company
CONTAINER DIVISION
220 East 42nd Street, New York 17, N. Y.

Los Angeles 54, Cal. 5120 South Soto St.
Chicago 38, Ill. 5133 West 65th St.
Kansas City 3, Kan. 2102 Kansas Ave.
Springhill, Louisiana
Somerville 45, Mass. Clyde & Warwick Sts.
St. Louis 11, Mo. 7901 Michigan Ave.
Whippany, New Jersey
New York 17, N. Y. 220 East 42nd St.
Cleveland 13, Ohio 1001 Terminal Tower
Wooster, Ohio 689 Palmer St.
Philadelphia, Penn. 1126 Lincoln-Liberty Bldg.
Georgetown, So. Carolina

Sailor Beware! The Old Man of The Sea!

WHO has not read of Sinbad, as told in the Arabian Nights by glamorous Scheherazade?

Shipwrecked on a strange island, the unfortunate sailor came upon a weak old man. Moved by compassion, Sinbad took the feeble fellow on his back, carried him over the brook, gathered fruit and fed him. But when Sinbad asked him to get down, the old man refused, wrapping his legs about his neck, almost strangling him.

The sailor fainted and fell down, yet the old man clung ever closer. He rained blows on Sinbad, driving him about without rest, to pick fruit and do his pleasure. This went on and on, until the desperate sailor made wine from wild grapes to appease his own plight. One day noting Sinbad's pleasure, the old man snatched a gourd of wine and gulped it down. Completely drunk, he loosened his grip and Sinbad threw him off. Saved by a passing ship, his rescuers said, "You are the first ever to escape strangling by the Old Man of the Sea".

Dating back hundreds of years, the Old Man is an allusion familiar to everyone. He is a warning figure today. Our nation, surviving the storms of two world wars, wanders down strange ways. With kindly intent and glorying in its own strength, America is tempted to shoulder the Old World and its age-worn problems. But weak and feeble as the Old World appears to be, let us beware! How easy to assume a burden which would quickly exhaust our strength, strangle us as a nation, and in the end leave the world as weak and exhausted as it was before our foolish undertaking!

QUALITY YOUNGSTOWN SERVICE

The Youngstown Sheet and Tube Company

General Offices--Youngstown 1, Ohio
Export Offices--500 Fifth Avenue, New York

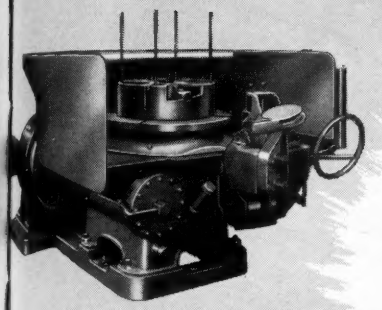
MANUFACTURERS OF CARBON ALLOY AND YOLOY STEELS

RAILROAD TRACK SPIKES - CONDUIT - HOT AND COLD FINISHED CARBON AND ALLOY BARS - PIPE AND TUBULAR PRODUCTS - WIRE - ELECTROLYTIC TIN PLATE - COKE TIN PLATE - RODS - SHEETS - PLATES.

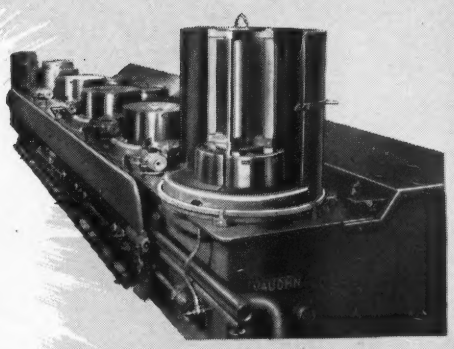
FOR THE *MATERIAL* YOU DRAW—
FOR THE *SIZES* YOU REQUIRE—
FOR THE *TONNAGE* YOU WANT—

Vaughn®

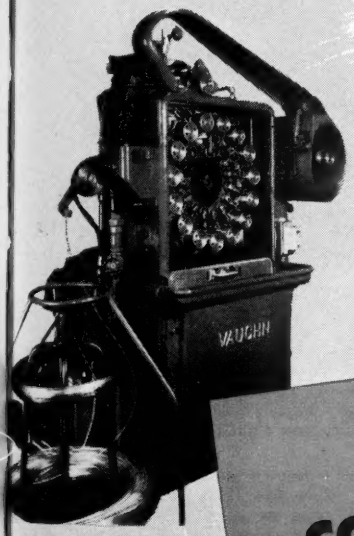
has the *RIGHT* EQUIPMENT to handle the job!



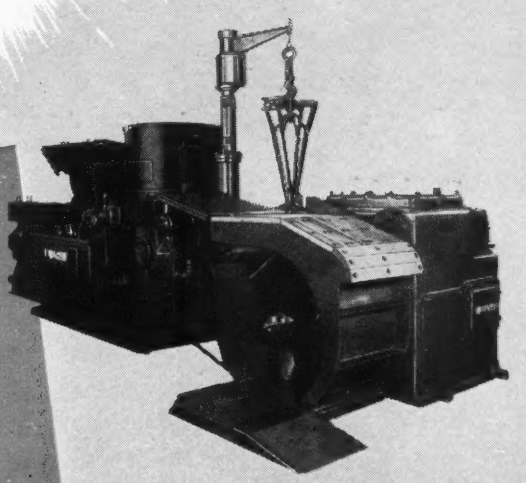
MOTOBLOC®



MOTOBLOX®



RINGBLOX®



CONTINUOUS MACHINES

"Quick on the Draw!"

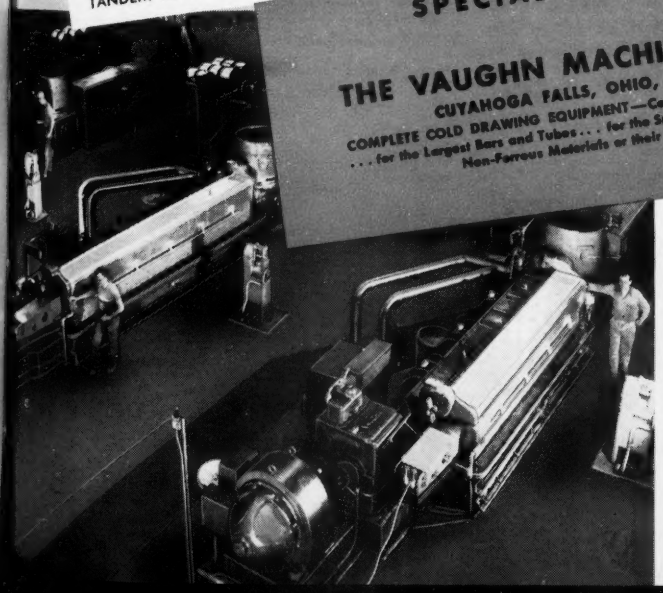
VAUGHN COLD DRAWING EQUIPMENT

WIRE • BARS • TUBES
SPECIAL SHAPES

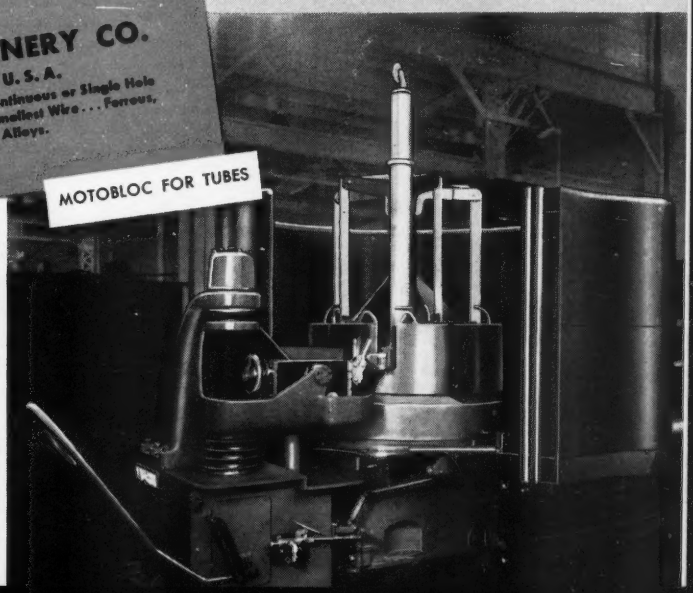
THE VAUGHN MACHINERY CO.
CUYAHOGA FALLS, OHIO, U. S. A.

COMPLETE COLD DRAWING EQUIPMENT—Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

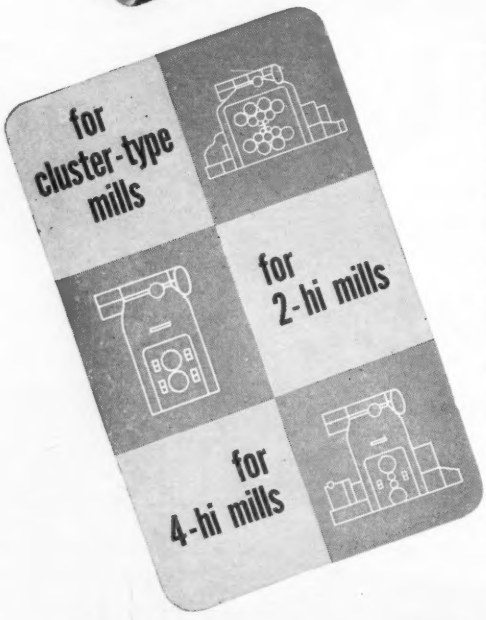
TANDEM MACHINES



MOTOBLOC FOR TUBES



WORK ROLLS WITH THE *MAGIC* TOUCH . . .



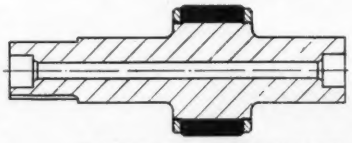
● Here's the magic key to improved surface finish, more uniform gauge and closer tolerance on all types of cold-rolled metal strip. Whether you require an ultra-mirror finish or just a plain, smooth surface—work rolls of Talide (Tungsten Carbide) are the answer. Only Metal Carbides has the know-how and experience to produce carbide rolls from 1 pound laboratory size up to 1,000 pound production mill rolls.

Long-lasting Talide Rolls, made of the world's hardest metal, step up mill production and reduce scrap and rejects. They last 25 to 50 times longer between grinds, and can be reground twice as many times as ordinary rolls. They impart improved physical properties to the strip, reduce plating costs, and eliminate the need for subsequent polishing operations.

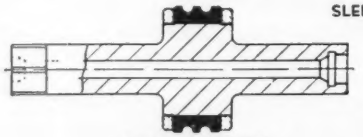
Over 50 mills are now using Talide Rolls for rolling cold-rolled, copper, brass, stainless, spring steel, razor steel, alloys, carbons, aluminum foil, tinsel ribbon, flat and shape wire.

Talide Rolls are designed to help the metalworking industry produce more efficiently—in less time—at lower cost.

Send for Catalog CR-50



SLEEVED ROLLS FOR FLAT WIRE



FOR SHAPE WIRE

METAL CARBIDES CORPORATION
TALIDE
YOUNGSTOWN, OHIO.

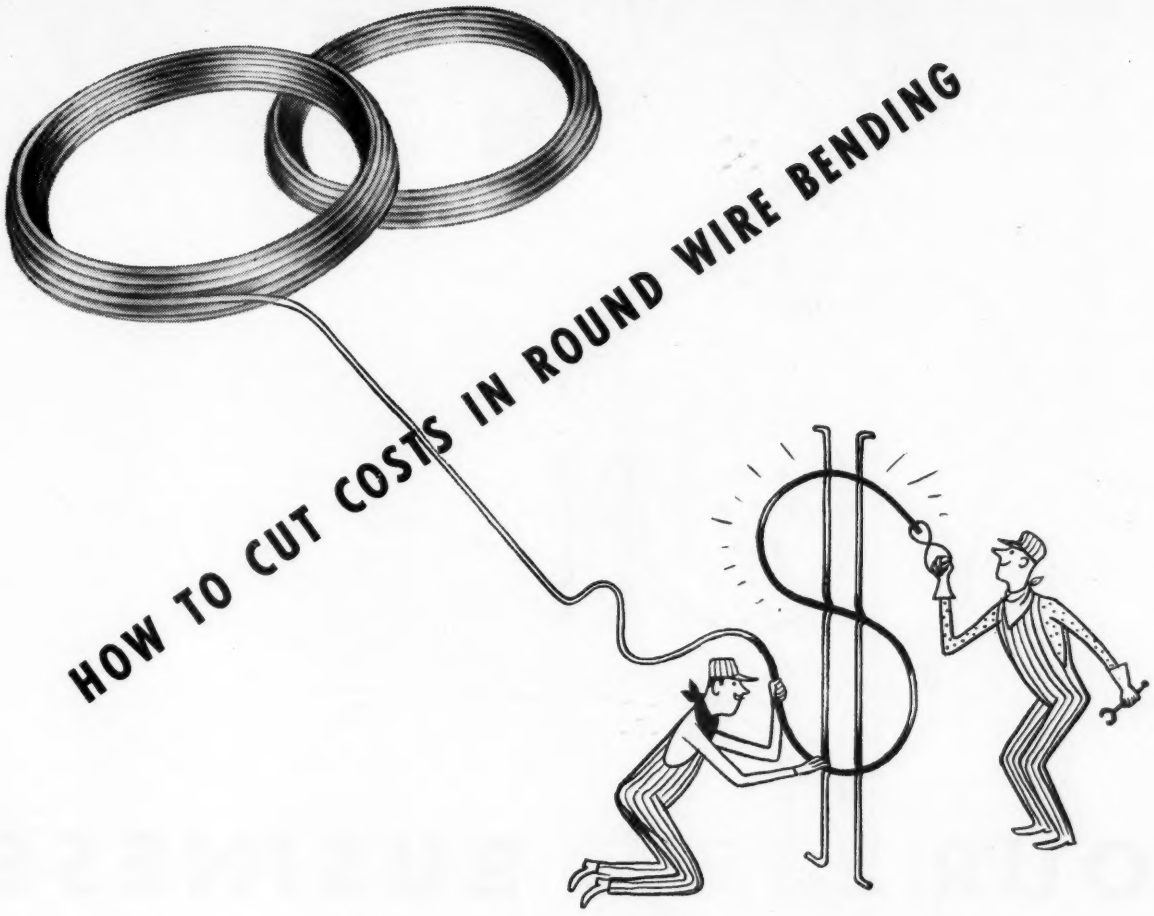
METAL CARBIDES CORPORATION

YOUNGSTOWN 7, OHIO

SINTERED CARBIDES • HOT PRESSED CARBIDES

CUTTING TOOLS • DRAWING DIES • WEAR RESISTANT PARTS

OVER 25 YEARS EXPERIENCE IN TUNGSTEN CARBIDE METALLURGY



Because Chase wire is highly "workable" you'll find it superior for round wire bending techniques which permit fabricating of complex shapes *in one continuous operation.*

Chase brass and copper wire is extremely ductile and malleable. This makes it particularly desirable for embossing, drawing, forming, shearing, cold-heading and other operations. It is also easily soldered, brazed, and welded.

Chase wire comes in rich colors ranging from copper red to golden color for manufacture of gold-plated ware. Painstaking inspection assures you a clean, smooth surface which means lower plating and polishing costs.

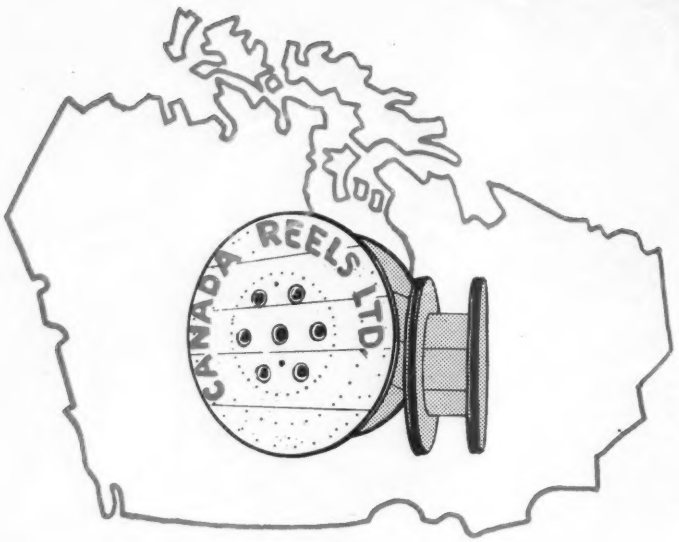
Chase® **BRASS & COPPER**

WATERBURY 20, CONNECTICUT • SUBSIDIARY OF KENNECOTT COPPER CORPORATION

• *The Nation's Headquarters for Brass & Copper*

Albany†	Cleveland	Kansas City, Mo.	New York	San Francisco
Atlanta	Dallas	Los Angeles	Philadelphia	Seattle
Baltimore	Denver†	Milwaukee	Pittsburgh	Waterbury
Boston	Detroit	Minneapolis	Providence	
• Chicago	Houston†	Newark	Rochester†	(†sales
Cincinnati	Indianapolis	New Orleans	St. Louis	office only)

IN *Canada*



OUR *Only* BUSINESS

That's right! The production of our new plant at Bury, Quebec will be devoted entirely to cable reels and packaging accessories.

We believe our new plant will occupy a unique position in Canada for the following reasons:

All machinery designed specifically for the manufacture of reels.

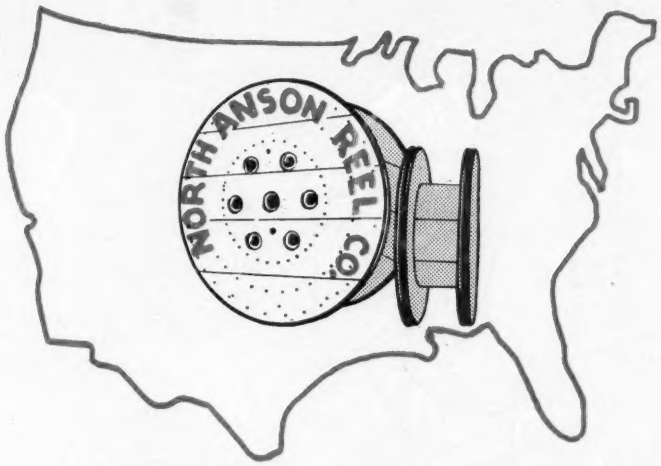
All lumber, from log to finished product, cut, sawn and graded for the purpose of making reels.

Our special machinery and selected materials, combined with straight-line production methods and reel-making experience of over 43 years, **will produce the finest reels with maximum economy.**

Canada Reels Ltd.

TELEPHONE BURY 67 **BURY, QUEBEC**

OR THE United States



IS MAKING REELS

In 1909, we made our first cable reel. Our production has been concentrated on reels, and only reels, since that date.

Of course, today's reels are a far cry from those made forty-odd years ago — both as to design and economy.

Just one example of present day reel quality is our metal bound reel now available through 54" in diameter. This reel will save up to 300% over all-wood reels; a fact proved by nearly five years experience in the plant and the field.

Whatever your reel requirements, we can furnish the reel you want. We have the experience, equipment, and the concentrated production of a plant designed solely for the manufacture of reels. We invite your inquiries.

North Anson Reel Co.

TELEPHONE MADISON 187-2 NORTH ANSON, MAINE

"Sure, he's contented! With Swift's Soaps, he knows he has the right soap for his wire drawing needs!"

That's one good reason why it pays to deal with Swift. In Swift's Soap line, you'll find the *right* soap for every job. And every soap produced by Swift for wire drawing offers efficient lubrication . . . minimum dusting . . . uniformly dependable quality. There are other good reasons, too.

● **Progressive research in soap development.** Swift's technical laboratories work consistently to maintain high product quality . . . to develop even better soaps for industry.

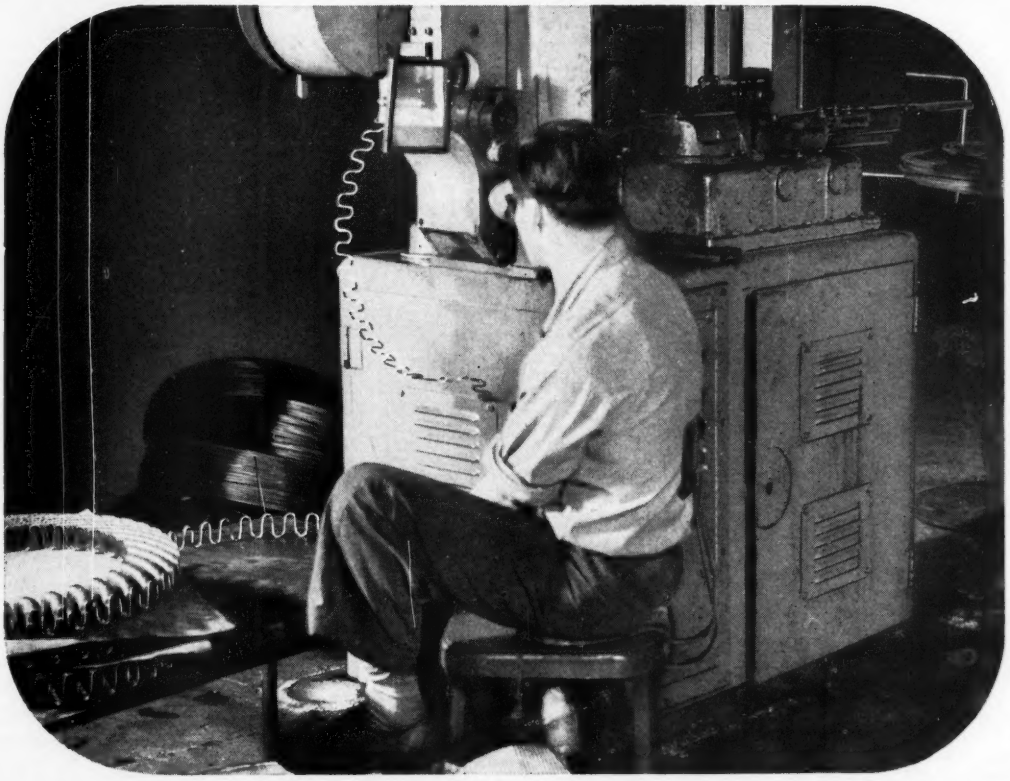
● **Prompt, resourceful service.** Swift's distribution points are strategically located from coast to coast. There's one near to you — ready to give you fast delivery on these and other fine Swift's Soaps:

Powdered White Ribbon • Guaranteed Powder • Snap Heavy Duty Wire Drawing Powder No. 282 • No. 559 Powdered Soap

SWIFT & COMPANY
Soap Department, Chicago 9, Illinois

Call **SWIFT** first for **SOAPS**

SPRING WIRE



For uniform quality, we're sure this spring wire is the best we've ever made

ROEBLING is about the largest specialty wire manufacturer in America. And with progressively improved facilities and more positive controls we are constantly turning out wires with a higher uniformity of gauge, finish and mechanical properties.

Among these products that save preparation time and boost production for users are mechanical spring wires including hard drawn, soft, annealed or oil-tempered M.B., H.B. and Extra H.B.; music wire; upholsterers' spring wire and valve spring wire...all in a full range of physical properties and finishes.

Reduce your machine shut-downs and step up overall production with the Roebling specialty wire that will meet your most exacting requirements. John A. Roebling's Sons Company, Trenton 2, N. J.

ROEBLING

ATLANTA, 934 AVON AVE • BOSTON, 51 SLEEPER ST • CHICAGO, 5525 W. ROOSEVELT RD • CINCINNATI, 3253 FREDONIA AVE • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST • DETROIT, 915 FISHER BLDG • HOUSTON, 6216 NAVIGATION BLVD • LOS ANGELES, 5340 E. HARBOR ST • NEW YORK, 19 RECTOR ST • ODESSA, TEXAS, 1920 E. 2ND ST • PHILADELPHIA, 230 VINE ST • SAN FRANCISCO, 1740 17TH ST • SEATTLE, 900 1ST AVE S. • TULSA, 321 N. CHEYENNE ST • EXPORT SALES OFFICE, TRENTON 2, N. J.

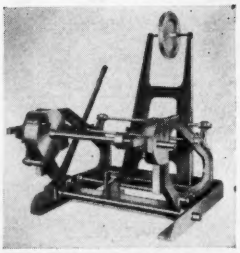
FOR FASTER, MORE UNIFORM EXTRUDING

...DAVIS-STANDARD EXTRUSION EQUIPMENT

Famous for a background of long, sound experience, Standard Machinery has engineered a line of extruding machines and auxiliary equipment that is preferred everywhere. It includes equipment for special-purpose applications.

Our equipment for *complete, continuous vulcanizing in all sizes* is outstanding for its many production advantages. Also, we design and manufacture head and stock screw units, thermo-plastic insulating equipment and other equipment for specialized jobs. Featured here are three of our finest accessory units.

Tell us your equipment needs or problems. Our engineers will cooperate with yours to give the best installation for your operation.

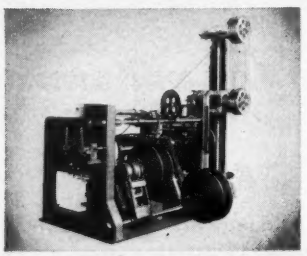


PAY-OFF

Unit is equipped to take reels up to 36" and 48" in diameter. Reel lift from floor is by cam-and-lever. Mechanism is automatically self-braking; brake is actuated by any slackening of wire speed. Rugged construction.

DAVIS-STANDARD CAPSTAN

Supplied in wide range — drag and pulling type, for almost all wire plant needs. Aluminum or cast iron drums, grooved or flat — any radii desired. Standard drum sizes 16", 24", 32", 48" and 60". Gear reducers standard, four speed transmission optional.



NEW, IMPROVED TAKE-UP OUTMODES OLD TYPES

Great, new efficiency. Noise- and vibration-free. No gears or clutches. Built to operate positively at high speeds. Reel drive by multiple double V-belts. Automatic brake. Totally new traverse mechanism. Speed range choice provided for constant tension control. For reels 6" to 36", larger sizes custom-built.

THE STANDARD MACHINERY COMPANY

14 WATER STREET — MYSTIC, CONN.

MOLDING PRESSES AND EXTRUSION MACHINES

World's Largest Manufacturers of Custom-Built Extrusion Machines

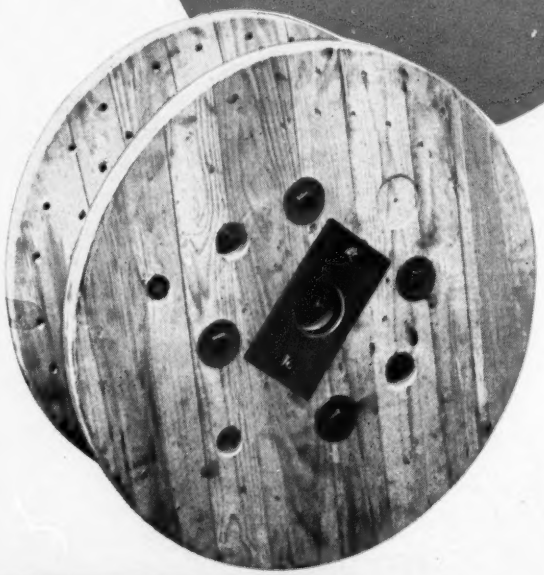
Export Office: Ballagh & Thrall, Independence Square, Philadelphia 6, Pa.

NOTHING BUT REELS ARE MADE BY BRIDGE

Above: First step in forming reel heads

WOOD REELS for CABLE • ROPE • WIRE

12" to 96" in diameter. Knocked down or assembled. Returnable or non-returnable. Reel heads for steel drums.



KEEP YOUR MILL SUPPLIED BY A REEL SPECIALIST

It will assure you of sturdy, strong, precision-made reels of highest quality. Our straight-line production methods make reels for you at the lowest possible cost.

Every operation is automatic, with specially designed tools and jigs that produce reels to your own specifications that you can depend upon for satisfactory service.

PLUS A SPEEDY SHIPPING SERVICE

Bridge delivers by truck to your door within a radius of 200 miles from the plant. Fast freight will bring you Bridge reels in 5 days or less east of the Mississippi.

BRIDGE
MANUFACTURING CO.
HAZARDVILLE, CONN.
Phone Thompsonville, 3375

Let us quote on your reel needs. Send your specifications. Better yet, visit our plant and see how and why our reels are made so well at so low a cost.

Fastest Process Annealing FOR COILED STEEL WIRE

- ✓ Annealing cycles accomplished in minutes rather than in hours
- ✓ 50% lower equipment cost
- ✓ less floor space
- ✓ no scale, decarburization, or other atmosphere effects

LOW- AND HIGH-CARBON STEELS

This typical Ajax installation process anneals 1200 lb. 18-gauge wire an hour in only 58 feet of floor space.

STAINLESS STEEL

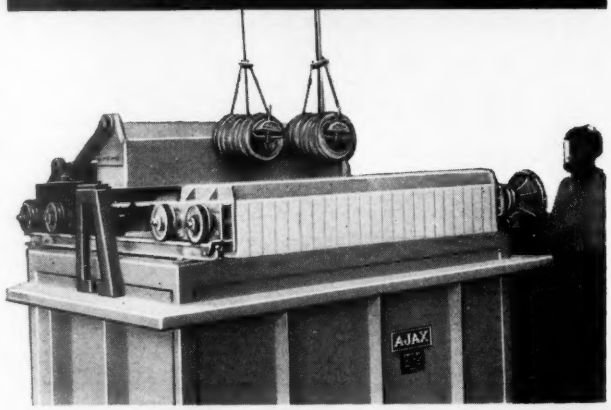
Annealing fine gauge nickel-chromium wire at 1950°F. Clean wire surface eliminates conventional pickling operations.

On-the-job production figures prove that no other method compares with an Ajax Electric Salt Bath Furnace in speed, uniformity, cost saving, and general all-around efficiency in process annealing all types of steel wire as well as aluminum, copper alloys, and silver alloys.

Heating cycles are far faster. Absolute uniformity is assured. Thanks to the exclusive Ajax electrodynamic stirring action, the temperature does not vary more than ±5°F. *in any part of the bath.*

The Ajax Salt Bath eliminates all atmosphere with its accompanying problems of oxidation, pitting, and decarburization. Preservation of metal surface is assured. Equipment cost is much lower —and the Ajax handles more work for a given amount of floor space than any other method. Ajax Reprints 62 and 63 gladly sent on request.

- **TOPS for WIRE PATENTING, too!**
- **IDEAL FOR DESCALING** hot-rolled stainless and alloy steel wire and other shapes employing either the Dupont sodium hydride or the Hooker Electrochemical Virgo bath.



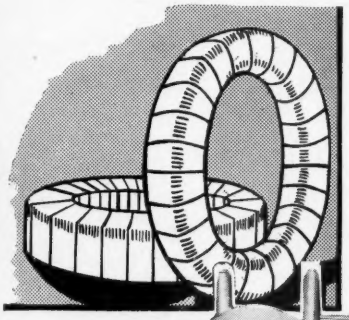
Associate companies: Ajax Electric Furnace Corp. • Ajax Engineering Corp. • Ajax Electrothermic Corp.

AJAX electric SALT BATH furnaces

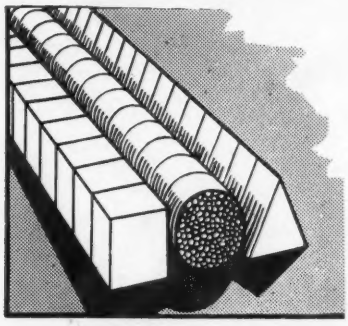
OVER 4,000 INSTALLATIONS . . . more than all other salt baths combined

AJAX ELECTRIC CO., INC., 928 Frankford Ave., PHILADELPHIA 23, Pa.

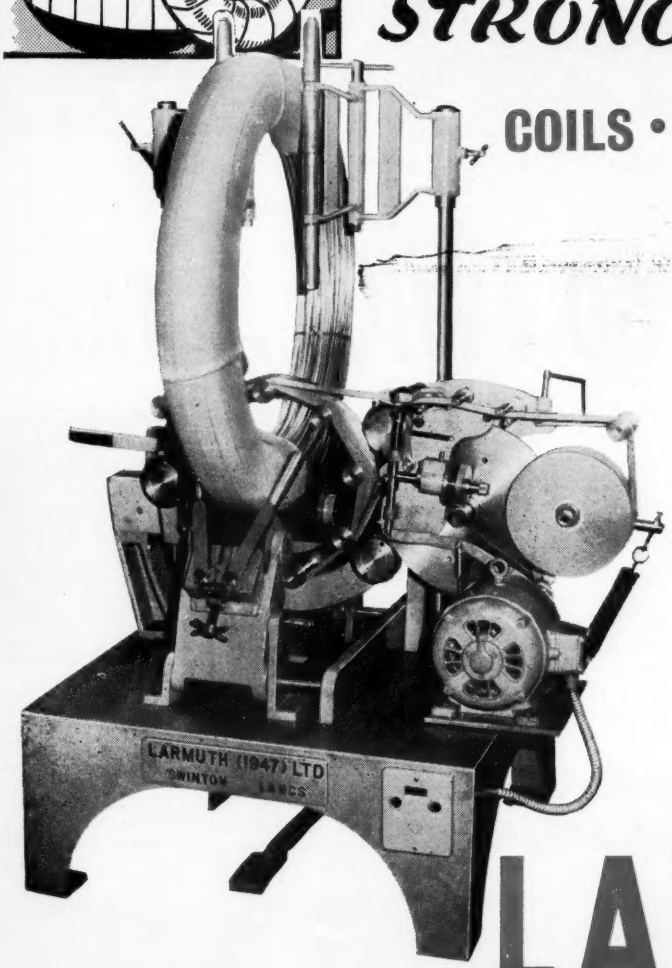
It Wraps These



QUICKLY NEATLY STRONGLY



COILS • WIRE • BARS • TUBES



For wrapping coils of Wire, Cable, Steel Strip, Tires or similar products in Kraft, Crepe and Waterproof papers, Cellulose Films or Hessian, etc. Also suitable for wrapping bundles of Bars, Rounds, Tubes, Sections, etc. Two Standard models wrap coils 8″ to 24″ outside diameter, up to max. width of 5″ and coils 12″ to 36″ outside diameter, up to max. width of 8″.

Manufactured by Messrs. Larmuth, Ltd., East Lancashire Road, Swinton, Manchester, England.

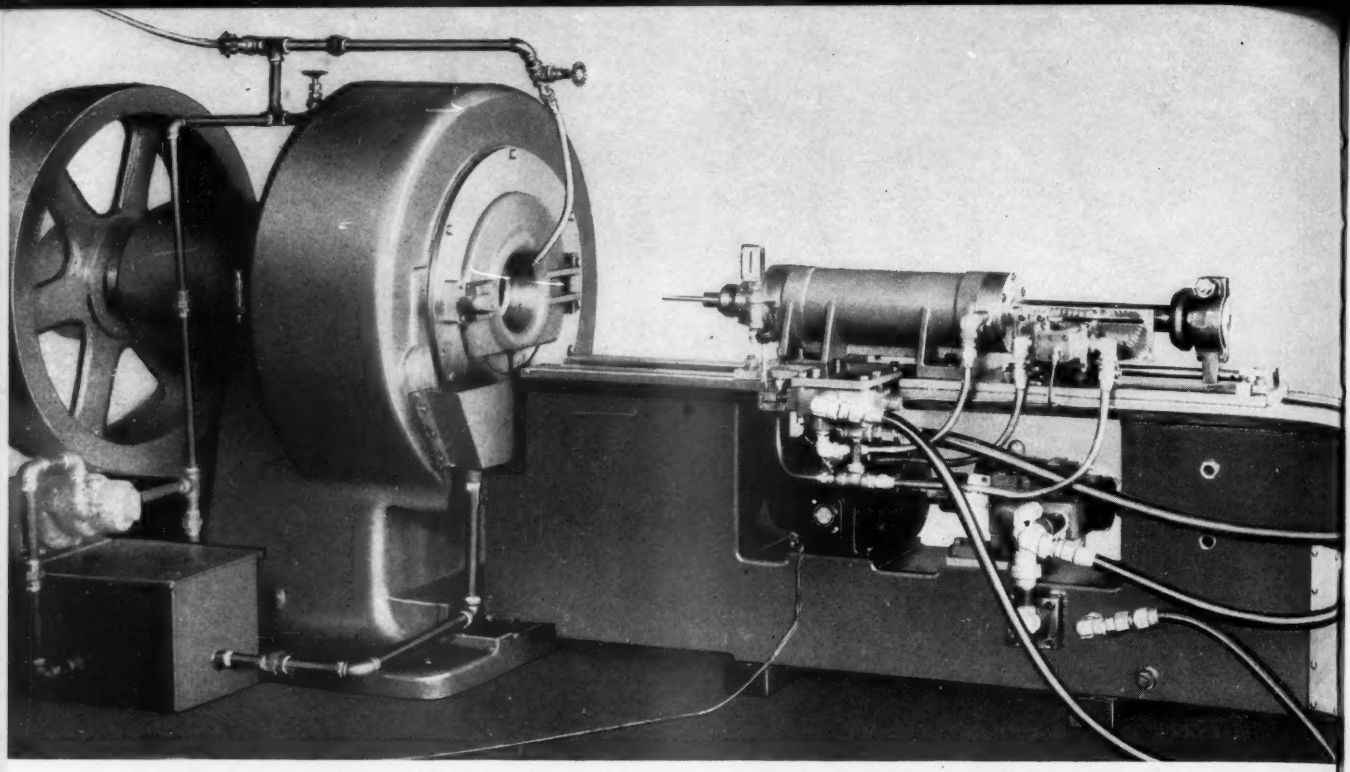
LARMUTH

POWER WRAPPING MACHINES

MARSHALL RICHARDS MACHINE COMPANY, INC.

1100 SOUTH BROAD STREET
TELEPHONE: TRENTON 9478

TRENTON 10, NEW JERSEY
TELEGRAMS: MARICH · TRENTON



FENN SWAGING MACHINE, featuring hydraulic feed, automatic chucking, and oil-cooled dies, is fast replacing lathes and screw machines for shaping a wide range of metal parts because it . . .

MAKES METAL GO TWICE AS FAR

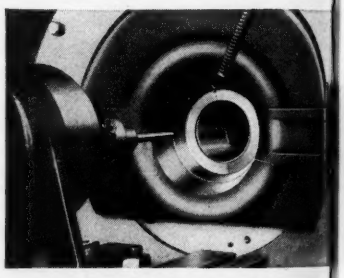
Yes, you can cut your metal requirements in half, in many cases, with this Fenn Swaging Machine. That's because it doubles the length of the blanks it shapes . . . with absolutely no stock removal.

MANY OTHER ADVANTAGES

What's more, this Fenn Swager produces a denser structure in metal parts . . . maintains concentricity . . . gives an improved finish . . . requiring no subsequent grinding . . . calls for less operator skill than any other machine capable of producing equivalent parts.

WRITE FOR SPECIFICATIONS

It will pay you to investigate all the cost-cutting, material-saving advantages of the Fenn Swager. Contact the Fenn distributor nearest you for facts and delivery schedules, or write direct to THE FENN MANUFACTURING COMPANY, 1853 Broad St., Hartford 1, Conn.



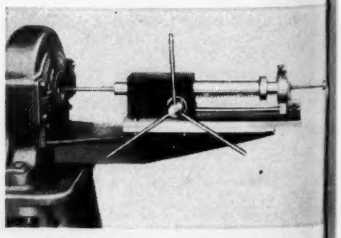
SIMPLE DIE CHANGES, using blanks in various diameters, make Fenn Swaging Machines quickly and easily adaptable to a wide variety of jobs. You can use them for reducing, pointing, or forming bar stock or tubing. Also for assembling fittings to cables. Fenn Swagers and Hydro-Formers come in sizes and designs for every swaging need.

FENN

Shaping metal for better and stronger products at lower cost

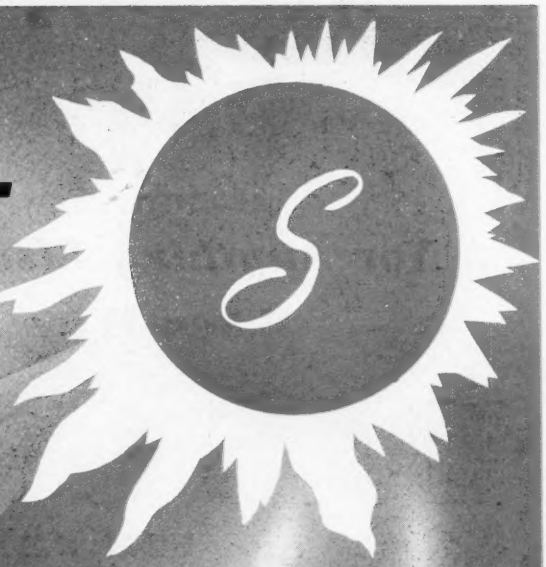
FENN MACHINES ARE SOLD BY:

ATLANTA
J. R. Walraven
BALTIMORE
Refer: Calco Mach'y Co., Phila.
BIRMINGHAM
Quinn & Quinn
BOSTON
Refer: C. Toolin, Providence
BUFFALO
Syracuse Supply Co.
CHICAGO
Neff Kohlbusch & Bissell, Inc.
CINCINNATI
The Seifreat-Elstad Machinery Co.
CLEVELAND
Wm. K. Stamets Co.
COLUMBUS
The Seifreat-Elstad Machinery Co.
DALLAS
C. J. Harter, Machinery
DAYTON
The Seifreat-Elstad Machinery Co.
DETROIT
The Chas. A. Strelinger Co.
GRAND RAPIDS
Joseph Monahan
HOUSTON
C. J. Harter, Machinery
INDIANAPOLIS
State Machinery Co.
KANSAS CITY, MO.
Robt. R. Stephens Machinery Co.
LOS ANGELES
Hoffman & Heartt
MILWAUKEE
Neff Kohlbusch & Bissell, Inc.
MINNEAPOLIS
Northern Machinery & Supply Co.
NEW ORLEANS
Stauss & Haas, Inc.
NEWARK
A. C. Cook
NEW YORK
The Silvers Machinery Co.
NORFOLK
Tidewater Supply Co. Inc.
PHILADELPHIA
Calco Machinery Co.
PHOENIX
Hoffman & Heartt
PITTSBURGH
Wm. K. Stamets Co.
PROVIDENCE
Charles Toolin
ROCHESTER
Syracuse Supply Co.
SAN FRANCISCO
C. F. Bulotti Machinery Co.
ST. LOUIS
Robt. R. Stephens Machinery Co.
SEATTLE
Star Machinery Co.
SYRACUSE
Syracuse Supply Co.
CANADA
MONTREAL, QUEBEC
TORONTO, WINDSOR
Williams & Wilson Ltd
FOR EXPORT:
Indianapolis Machinery Export Co., Inc., New York, N. Y.



FENN FEEDING DEVICES, either manually or hydraulically operated, are available for all sizes of swagers. They speed up production and reduce operator fatigue.

STAYS BRIGHT AS DAY! WITH STANDARD'S BRIGHT WIRE COMPOUNDS



STANDARD INDUSTRIAL COMPOUNDS COMPANY has pioneered most of the outstanding contributions to better wire drawing through better lubricants. Consult with STANDARD for the solution of your difficult problems. We welcome your inquiries.

STANDARD WIRE DRAW NO. 15

A new and different Compound for wet drawing, made from new and different materials that have a natural affinity for metals, a natural wetting-out characteristic, without the addition of a wetting agent.

Protects the wire from oxidizing for considerably longer periods than conventional compounds. Preserves the bright finish on copper coated or liquor finished wire and prevents tarnish on copper or brass wire for longer periods of time.

Below are some of the advantages of this compound:—

A. Small amounts needed. Due to the natural affinity for metal small amounts of this compound are needed. Draws high carbon wire at high speeds with a fat content as low as .30 per cent, because of this affinity for metal and the natural wetting-out characteristics.

B. Low pH value.

C. Protects steel wire from rusting and copper coated and liquor finished steel wire from oxidizing. Protects copper and brass wire from tarnishing.

D. A clean compound. Keeps equipment clean and drawn wire has a clean finish.

Contact one of our representatives below or our home office for details on this new compound and a sufficient quantity for test will gladly be furnished.

Bruce W. Siemon
2400 Morrow Pl.
Pittsburgh 34, Pa.

John A. Moritz, Jr.
4600 W. Ferdinand St.
Chicago 44, Ill.

Earl A. Bowers
5536 Lisette
St. Louis, Mo.

Charles P. Orr
Caledonia Park
Fayetteville, Pa.

Standard Industrial
Compounds Co.
Millbury, Mass.
Arthur J. O'Mara

wire drawing lubricants

Standard INDUSTRIAL COMPOUNDS CO., INC.

4600 WEST FERDINAND STREET
CHICAGO 44, ILLINOIS

IT'S

NO SOAP

Nor Anything Else—In The Die Box—
When Wire Is Coated With

DIE GARD 59

FOR DRY DRAWING

There are no additional operations with Die Gard 59 as it goes on the wire or rod with the borax . . . The wire can then be drawn thru as many as six dies and still have a satisfactory lubricant film remaining . . . Both high and low carbon, and alloy steels are being drawn dry with Die Gard 59 to sizes as fine as .018 . . . Speeds are normal and finished wire passes all test . . . Coated rod or wire has been stored for sixty days with no rust . . . A list of typical applications is available.

Add Die Gard 59 to your borax tank—dip—bake (or simply dry)—and draw with no lubricant at the bench!

- **Die Life Extended**
- **Speeds Maintained**
- **Lubricant Costs Lowered**

and you get rid of that

SOAP DUST—SOAP WASTE

CLEAN UP YOUR MILL WITH

DIE GARD 59

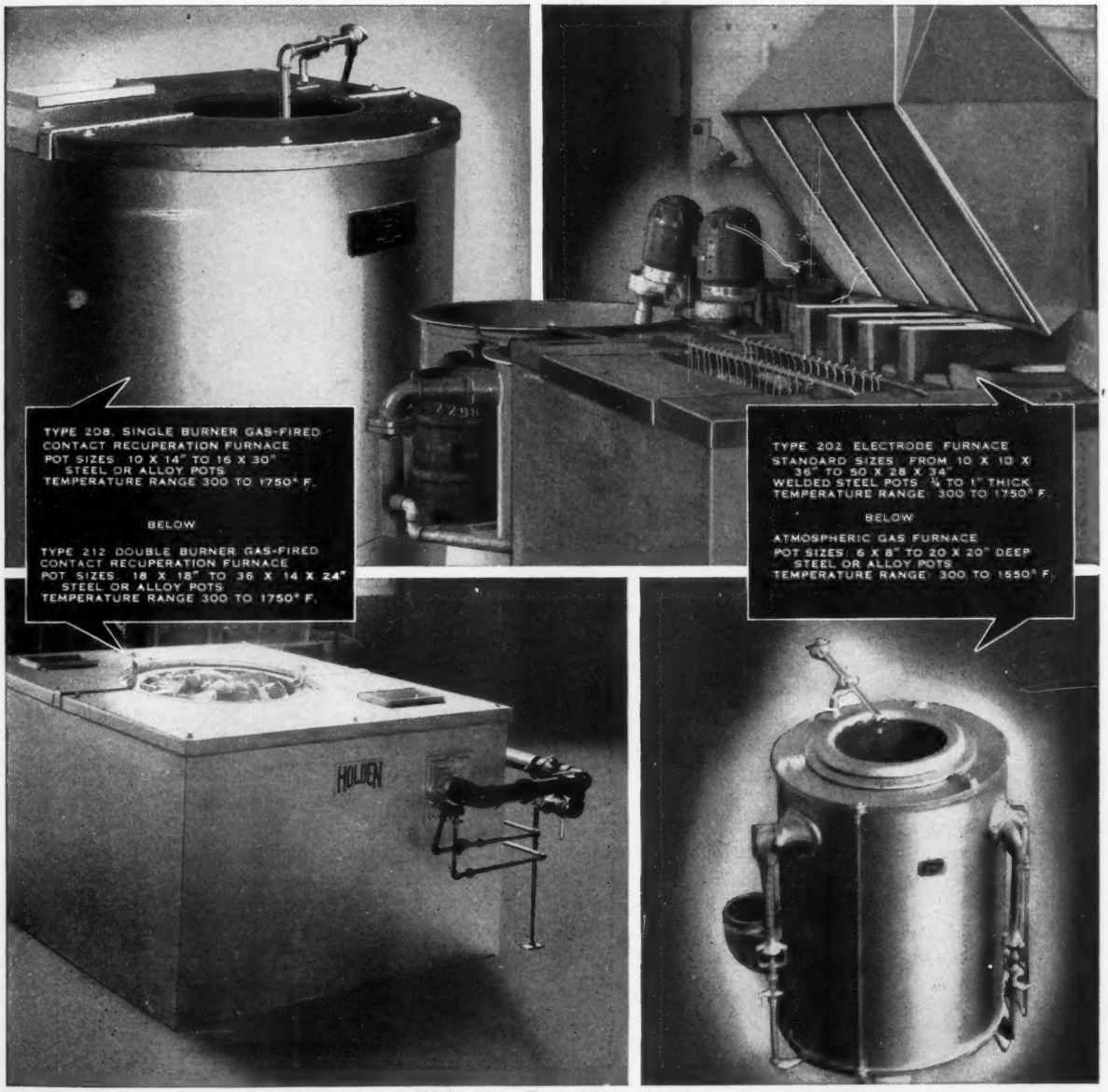
FOR DETAILS WRITE

REILLY-WHITEMAN-WALTON CO.

Basic refiners of fatty oils since 1923
Conshohocken—Pennsylvania

There is NO divided responsibility when you purchase

Holden Salt Baths and Furnaces


TYPE 208, SINGLE BURNER GAS-FIRED CONTACT RECUPERATION FURNACE
POT SIZES: 10 X 14" TO 16 X 30"
STEEL OR ALLOY POTS
TEMPERATURE RANGE 300 TO 1750° F.
BELOW
TYPE 212 DOUBLE BURNER GAS-FIRED CONTACT RECUPERATION FURNACE
POT SIZES: 18 X 18" TO 36 X 14 X 24"
STEEL OR ALLOY POTS
TEMPERATURE RANGE 300 TO 1750° F.
TYPE 202 ELECTRODE FURNACE
STANDARD SIZES: FROM 10 X 10 X 36" TO 50 X 28 X 34"
WELDED STEEL POTS: ¼ TO 1" THICK
TEMPERATURE RANGE: 300 TO 1750° F.
BELOW
ATMOSPHERIC GAS FURNACE
POT SIZES: 6 X 8" TO 20 X 20" DEEP
STEEL OR ALLOY POTS
TEMPERATURE RANGE: 300 TO 1550° F.
HOLDEN

Write for Free Literature

THE A. F. HOLDEN COMPANY

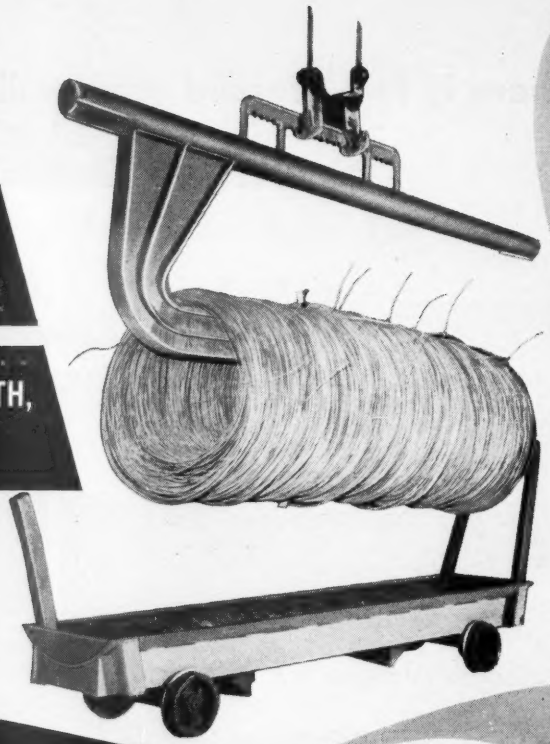
P. O. Box 1898
New Haven 8, Conn.

11300 Schaefer Highway
Detroit 27, Michigan

Again . . .

WELDCO MONEL HOOKS PROVE THEIR SUPERIORITY

FOR LONGER LIFE, GREATER STRENGTH, EXTRA CORROSION-RESISTANCE



IT'S WELDCO RIGHT DOWN THE PICKLING LINE!

SEVERAL YEARS AGO, a Joliet wire mill ordered 4 Weldco Monel pickling hooks. These hooks soon proved so superior to heavy cast hooks (also in use) that 16 more were installed, and the cast hooks were diverted to lighter service. So once again, as in many other cases, Weldco replaced heavy, old-style hooks right down the pickling line. The reason: Weldco hooks are stronger, lighter in weight, easier to handle, more corrosion-resistant, and carry heavier loads.

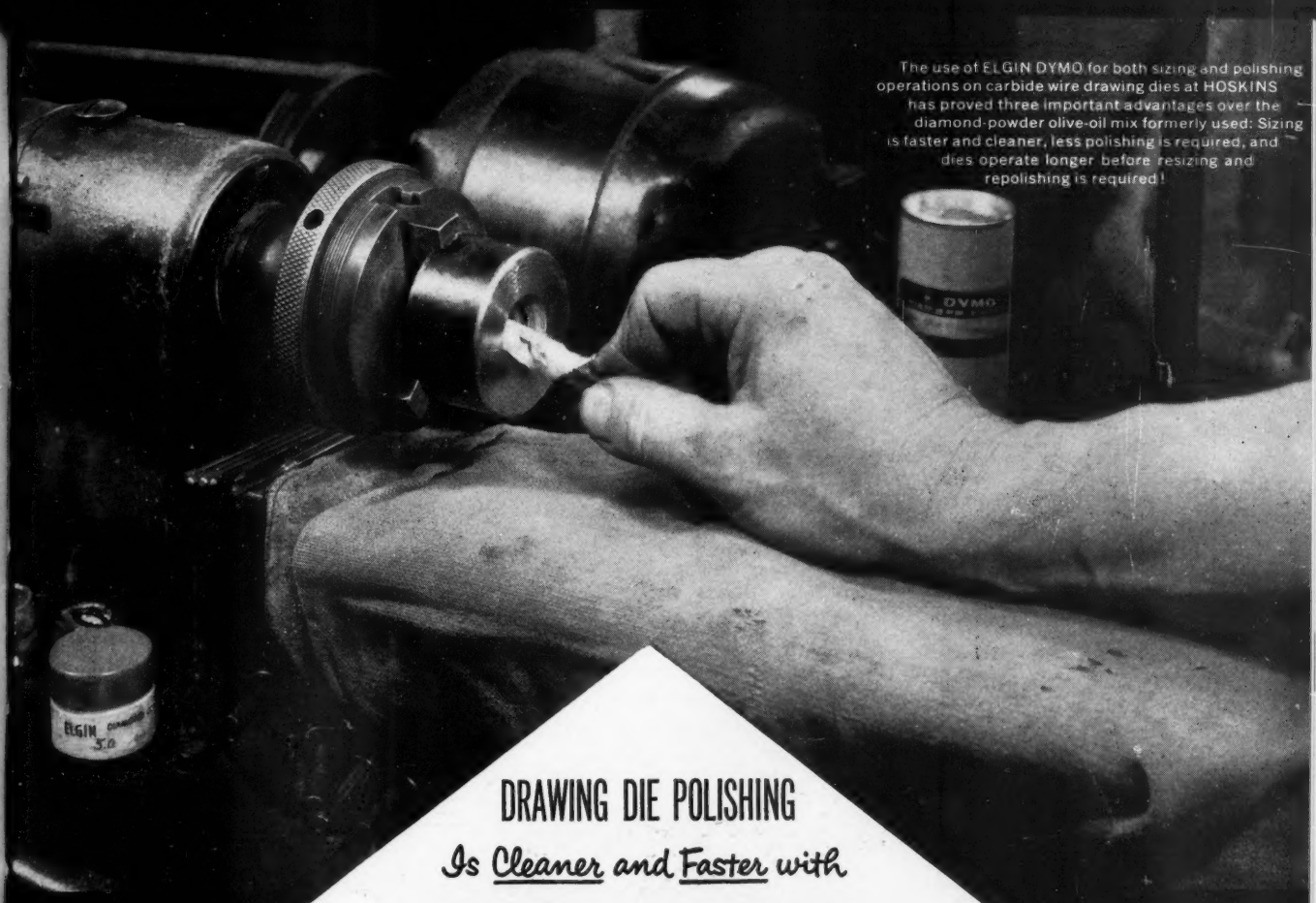
The Weldco pickling hook shown above carries 5,000-lb. loads easily . . . has a special notched lifting "bale" for use with a double-crane hook. This design helps balance the load—makes possible rapid, efficient handling, with less manpower needed. Weldco engineers built this hook to meet the requirements of one particular mill, and can do the same for **your** plant.

Depend on Weldco's ingenuity and years of fabricating experience, for all your pickling and liming equipment. Whether you need conventional lightweight Monel hooks or special adaptations, Weldco engineers design and build to meet your exact requirements. For complete pickling information, get in touch with us today.

WELDCO

THE YOUNGSTOWN WELDING & ENGINEERING COMPANY

3723 OAKWOOD AVENUE . . . YOUNGSTOWN 9, OHIO



The use of ELGIN DYMO for both sizing and polishing operations on carbide wire drawing dies at HOSKINS has proved three important advantages over the diamond-powder olive-oil mix formerly used: Sizing is faster and cleaner, less polishing is required, and dies operate longer before resizing and repolishing is required!

DRAWING DIE POLISHING

Is Cleaner and Faster with

ELGIN DIAMOND

. . . at HOSKINS MANUFACTURING COMPANY

in Detroit, leading producers of high alloy resistance wire. Elgin's ready-to-use packaging and color identification of the various grades add still further savings in shop time. Elgin Diamond in DYMO will reduce your finishing and polishing costs, too, and give you uniform top quality results. That's why more and more of the country's leading wire mills . . .

Finish with Diamond ... ELGIN Diamond!

DYMO

. . . FOR GENERAL POLISHING

DYMO-C

. . . FOR CARBIDES

ABRASIVES DIVISION, DEPT. G

ELGIN NATIONAL WATCH COMPANY

ELGIN, ILLINOIS

for economy in coiling,
knotting, forming —

use **Pittsburgh**

Oil Tempered
SPRING WIRE

Day after day, in plant after plant Pittsburgh Oil Tempered Spring Wire is proving that it has the acceptance of production managers and machine operators alike. They find it has the uniform size accuracy and ductility to work smoothly in coiling, knotting, and forming machines. This reduces time; keeps production records climbing. That is why it pays to specify Pittsburgh Oil Tempered Spring Wire. It has the quality, proved in use that gives you economical production runs. For information write Department WWP, Grant Building, Pittsburgh 30, Pa.

Pittsburgh Wire

657b

A product of **PITTSBURGH STEEL COMPANY**

Announcement!

of

A Regional Meeting

of

THE WIRE ASSOCIATION

will be held in

Montreal, Canada

May 7 and 8, 1953

at the Mount Royal Hotel

The program will cover matters of interest to both ferrous and non-ferrous wire men.

Watch for details in future issues of this paper.

THE WIRE ASSOCIATION

RICHARD E. BROWN, Executive Secretary

453 MAIN STREET **STAMFORD, CONN.**

For the FINEST Dies...

Specify

DIES... TOOLS... WEAR PARTS... BLANKS...

TELEPHONES: FACTORY and BRANCHES

BIRMINGHAM, ALA. 4-0377	DALLAS, TEXAS DIxon 4038	KALAMAZOO, MICH. Kalamazoo 5-4294	MINNEAPOLIS, MINN. Bridgeport 2792	PITTSBURGH, PA. Hiland 1-8548	SAN FRANCISCO, CAL YUkon 6-6505
BOSTON, MASS. DEcatur 2-4456	DENVER, COLO. Tabor 0444	KANSAS CITY, MO. Baltimore 1700	MOLINE, ILL. Moline 3821	PORTLAND, ORE. ATwater 9641	SCRANTON, PA. Enterprise 1-0551
BUFFALO, N. Y. AMherst 3838	DETROIT, MICH. UNiversity 4-6400	LIGONIER, IND. 414	NEWARK, N. J. Mitchell 2-8532	READING, PA. Enterprise 1-0551	SEATTLE, WASH. Seneca 5488
CHICAGO, ILL. NAtional 2-3434	HARTFORD, CONN. 32-5197	LOS ANGELES, CAL. LOgan 5-9811	NEW YORK, N. Y. MUrray Hill 3-0291	ROCKFORD, ILL. Enterprise 2504	SYRACUSE, N. Y. Enterprise 9593
CINCINNATI, OHIO Kirby 2818	HOUSTON, TEXAS CHarter 6551	LOUISVILLE, KY. Taylor 5960	ORISKANY, N. Y. Utica 6-1988	SAGINAW, MICH. 4-3384	WAUKEGAN, ILL. ONtario 2-5220
CLEVELAND, OHIO WOodbine 1-1742	INDIANAPOLIS, IND. Winthrop 2132	MILWAUKEE, WISC. Division 2-0204	PHILADELPHIA, PA. TEnnessee 9-5478	ST. LOUIS, MO. Mission 0113	YORK, PA. Enterprise 9945

IN CANADA: (TOOLS) CARBIDE TOOL CO. W. Toronto 9, Ont. (DIES) VASCARB TOOL & DIE CO. Hamilton, Ont.

The Wire Outlook

Can there be any relation to the highly successful Convention last month, at which a renewed spirit of optimism and confidence on all sides was apparent, and the election of General Eisenhower? Most certainly there was. It is not a question of putting our faith in a single man, but of faith in the principles for which he stands—of restored integrity, dignity, justice and moral stamina to government. Voted out was dishonesty, confusion, vacillation, extravagance, corruption and political persecution. The slogan—"You never had it so good; why change?"—carried little weight, because thinking men and women knew that pursued much further, the New and Fair Deal policies would have resulted in a crash to end all crashes—taking us all down. The amazing thing is that *anyone* could have felt otherwise.

Business optimism has replaced pessimism. Business and the stock market reflect this optimism in the current upsurge. Many who looked for a mild recession in 1953 now are inclined to put it off until 1954. Some reaction to the former administration's extravagance and waste is bound to come, if only as a readjustment to a sounder economy. When taxes are reduced, in the degree to which they are lowered, there will be healthy response in consumer buying that will be the only kind of spending that can do business any long-range good. Unfortunately, undue expenditures must still be made for arms. This condition will be with us until the Soviet Union either collapses or enters the fold of peaceful and non-aggressive nations.

Industrial production, paced by the steel industry, is 225% of the 1935-39 average. The previous high was in April, 1951, when it stood at 223%. Last year at this time it was 218%. Major business expansion projects for the present will probably level off after mid-1953 and a reappraisal of the outlook will be in order at that time. As in any period of great optimism, businessmen should keep their eyes open. We can and should expect now, however, the building of a more solid foundation for our future prosperity.

With the rebuff to labor greed and its over-reaching for power, industrialists must be careful not to repeat the errors of the past. A more enlightened attitude toward labor by management is essential or the pendulum most surely will swing back further than ever, if occasion is provided. A new era of management-labor relationships is possible and necessary and that it can be done is evidenced by the fact that some concerns have achieved a success in this respect that has both increased production and eliminated labor strife.

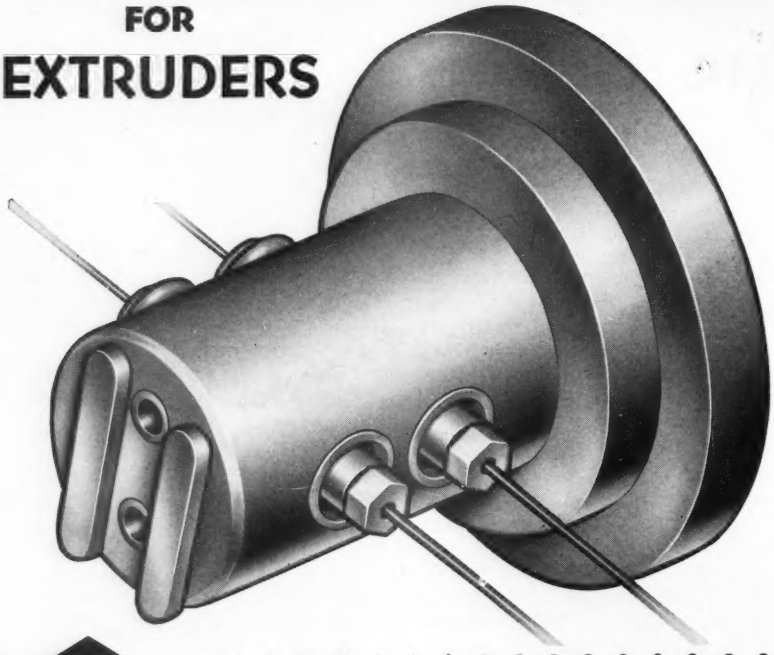
The automotive industry has come back strong as a buyer of electric wire and cable, valve springs, upholstery springs and control wire and cables. Bed spring demand has also taken a healthy spurt. Fastener manufacturers are now getting plenty of wire rods for the lighter sizes, for which the demand is slightly off, but can't get enough for the larger bar sizes. The falling off in fastener demand is attributed to inability of the buyers to get other forms of steel for their product manufacture. Alloy bolts and nuts are in heavy demand for tanks, gun mounts and other armament items.

Rod and wire came back into fair supply more quickly than had been anticipated and wire mills are running very close to normal deliivery schedules.

The untangling of the appalling muddle of national and international affairs that twenty years of irresponsibility has gotten us into will take time, but it will be done fearlessly and fairly. In the assurance of competence and economy in Washington, business can once again begin to plan, confident of the future.

—from the Editor's Desk

MULTIPLE *Wire Heads* FOR EXTRUDERS



JLE

INCREASE PRODUCTION BY USING A TWO, THREE OR FOUR WIRE HEAD

Description

The flange bolts to the customer's extruder. The hot plastic is fed into our head and extruded around the wire. The wires are pulled through as indicated above. The head is heated by cartridge heaters.

Outstanding Features

- ★ May be adapted to present extruder with little or no cost and requires no modifications of the customer's extruder.
- ★ Compound flow to each tool set can be individually regulated or turned off.
- ★ Servicing, changing strand, or tip and die replacement can be performed on any one wire line while the remainder continue operating.

Ask For CAT. SEC. 9A

(See Page 1317 for complete listing of JLE Products for the Insulated and Bare Wire Industry)

JAMES L. ENTWISTLE CO.

1475 ELMWOOD AVE. PROVIDENCE 7, RHODE ISLAND, U. S. A.

European & South American Agents:
M. CASTELLVI, INC.
150 BROADWAY, NEW YORK 38, NEW YORK

British Associate:
GENERAL ENGINEERING CO., LTD.
BURY ROAD, RADCLIFFE, LANCS., ENGLAND

JLE

WIRE AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip.
DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 27 DECEMBER, 1952 No. 12

Organized Cost Reduction

by Paul V. Crooks
Works Industrial Engineer
Newburgh Works
American Steel and Wire Division
United States Steel Company

Gentlemen, the average members of steel plant management, either directly or indirectly, control between 90% to 95% of the incurred costs of the operations.

★ ★ ★

Time will not permit me to discuss each and every individual's operations or problems. However, I will discuss a method of thinking, fundamentals and universal truths which can be applied to our problems universally. The application of these fundamentals to specific problems cannot help but result in bona fide cost reduction.

What Is Cost Reduction?

After all—Cost Reduction means simply finding less expensive ways of doing the job.

★ ★ ★

We must concern ourselves with a better use of manpower, machines and material throughout all functions of management, none excluded. Cost reduction to be effective must be obtained using an expenditure of money consistent with the savings to be realized.

★ ★ ★

Cost reduction is certainly not a new topic. It's one of our biggest concerns, if not the biggest. With the present trend of inflation, it behooves us to be more alert than ever in recognizing ways and means of lowering costs.

★ ★ ★

Having good reason to talk about cost reduction, let's consider the philosophy of "Organized Cost Reduction". The word "organized" suggests some sort of planning and planning usually involves fundamentals.

★ ★ ★

To orient our thinking of the part that planning and fundamentals play in organized cost reduction, I would like to again refer to that frustrating but ever popular sport, golf.

★ ★ ★

How many of you have ever tried to master this sport? How many of you play at it? What is the primary difference between those of us who play at it and those of us who have mastered it? Next time you are out on the golf course take a good look —what percentage of the people do this?

★ ★ ★

What is lacking in this particular example? What must we do to master the art of playing golf? If we expect to improve our score, we must improve the game that we have standardized for ourselves over a period of years. We must cor-

A paper delivered at the opening session of the annual Convention of The Wire Association in Cleveland, Ohio, on November 10, 1952.

The author describes the fundamentals and principles that underlie the problem of keeping costs at a minimum, as concerned with the handling manpower, machines and materials—a problem of management in every manufacturing plant.

Mr. Crooks attended Fenn College and studied at the Case Institute of Technology. He started with American Steel and Wire as a weigher at the Newburgh Works in September, 1940. He was successively a time study man, assistant industrial engineer, and industrial engineer at that plant before being named works industrial engineer on March 1, 1951.

Paul V. Crooks * * *

rect our bad habits, and adopt some new good ones, and in order to do so, we have only one alternative, and that is to go back to the fundamentals. What are the fundamentals of golf?

★ ★ ★

Here we have the simplest kind of fundamentals as taken from Sammy Snead's book. He tells us how to grip the club. He gives us the simple details of a golf swing from the straight left arm, the flexed pivoting of the wrists, the smooth action of the hips to the follow through; and then also, a compensating study of the simple layout of the course on which you may be playing. According to Snead everything is disgustingly simple and in such understandable sequence that everyone should be able to duplicate his mastery of the game.

★ ★ ★

After we have adopted the fundamentals, practice is the only way in which we will be able to achieve practical utilization of these fundamentals.

★ ★ ★

There is no great bundle or complex knowledge behind the process of cost reduction any more than there is behind golf. There are no mysteries. The process is simplicity in itself. There is only one magnificent, relatively unprobed and unmeasured phenomenon that you have to work with in organized cost reduction and that is the human mind.

★ ★ ★

I wonder how many times ancient man watched a log or a great stone roll down a mountainside before the idea occurred to him that an axle could be inserted into that rolling object and turned into a usable wheel? Eons of time undoubtedly passed before the first human mind exerted itself enough to come up with this simple idea. Yet it has revolutionized the world.

★ ★ ★

And, that this simple idea alone was not immediately obvious to all mankind is testified to by the fact that when the early explorers rolled through Texas and the Southwest into Mexico, they found the nomadic Comanche Indians moving their belongings about on a drag-like arrangement consisting of two saplings lashed one to either side of a horse and towed with the load strapped across the drags.

★ ★ ★

When we open the mind and free it from the chains of our daily habits of thinking, it can lead us in many directions to find new answers to the problems at hand.

★ ★ ★

Here are the five steps that can be applied to every problem you ever faced, whether it's in the shop, whether it's in your home, or whether it's on the golf course or on the bowling alley.

1. **Determine an area which needs improvement.**
2. **Get the facts.**
3. **Analyze the facts.**
4. **Develop a better method.**
5. **Install the better method.**

★ ★ ★

In that Step #5—"Install the Better Method"—we have the key to progress not only for ourselves or our companies, but of the world.

★ ★ ★

Throughout the ages thinking man has always realized that the story never ends with Step #5, but immediately reverts to Step #1. People have said this same thing in a number of ways.

★ ★ ★

It is the constant march of the installation of new ideas into actual operation which has marked the progress of mankind through all time. It is an inexorable march which cannot be resisted. Victor Hugo dramatized this thought for us when he said: "No Army can withstand the strength of an idea whose time has come."

★ ★ ★

And, when our ideas have been worked out through the organized approach to cost reduction, it is the law of mankind and of history that we install them at the earliest possible moment.

★ ★ ★

When you have accomplished this, you have made a personal contribution to the welfare of your fellow man even though he may not be able to measure it like you can a pound of sand or a cube of material. It is like interest in the bank book of security.

★ ★ ★

The first step is to look in the most likely areas, to determine where the greatest potential seems to be. In other words, "take aim" at a target. Doctor Charles Stine didn't know what he was after when he started in search of nylon.

★ ★ ★

At DuPont, his associates will tell you that his outstanding point was curiosity. There would probably be no nylon had he not asked the question: "I wonder what would happen if molecules were rearranged so that they would be in lines instead of clusters?"

★ ★ ★

Doctor Stine thus created a target which he then handed to Doctor Wallace Carothers. As a leader of the scientific team which first synthesized nylon, Doctor Carothers was highly honored by his company. Today, the nylon research laboratory is dedicated to his honor.

★ ★ ★

Another man who spotted his target and took aim with terrific success was Doctor Walter Reed. He was sent to Cuba as the head of a yellow fever commission to try to find a cure.

★ ★ ★

On arrival he found the latest to die had been near no other victim.

★ ★ ★

"You mean to say this man had no contact whatsoever with the disease?" asked Major Reed.

★ ★ ★

"None" was the reply. "He was in the guard house for six days with six other men and he was the only one to catch it."

★ ★ ★

"Well, if you are right about this," said the Major, "then something must have crawled or jumped or flown through the guard house window, bitten that prisoner and then gone back to where it had come from. I am convinced that the time has come to set aside our microscopes and learn how yellow fever spreads from man to man. The poison is probably carried by an insect and that may be a mosquito."

★ ★ ★

Of all the bleary-eyed efforts to track down the cause of yellow fever through the usual microscope techniques, Major Reed, in that one observation, set the aid that led to its conquest.

★ ★ ★

When we seek to determine the area in which we can most likely effect maximum cost reductions, there are certain targets that better deserve the focus of our attention.

1. **Ineffective use of manpower.**
2. **Bottleneck situations.**
3. **Excessive delays.**
4. **Hazardous conditions.**
5. **Poor Material utilization.**
6. **Excessive maintenance costs.**
7. **Difficult working conditions.**

★ ★ ★

Sure, you can effect savings, MAYBE, if you put a soap dispenser in the men's washroom, if you put up a sign saying "Turn out the lights". These are well and good, and we need this type of savings too.

★ ★ ★

But, LET'S ALL LOOK AT THE IMPORTANT PROBLEMS FIRST.

★ ★ ★

To come up with a workable plan in the organized approach to cost reduction calls for GETTING THE FACTS.

★ ★ ★

Nobel Prize winner, Ivan Pavlov, at the age of 87 said: "Perfect as is the wing of a bird, it never could raise the bird up without resting on air. Facts are the air of a scientist. Without them you never can fly."

★ ★ ★

Before Doctor George Minot could establish a cure for anemia he had to devise a way actually to watch the cells of bone marrow as they visibly created new corpuscles. Only thus could he lay his hands on the essential facts attendant on his problems.

★ ★ ★

It took plenty of analysis, plus creative sweat, plus new facts for him to find that folic acid was what anemia needed. And then it took more new facts to learn that liver is the best source for folic acid.

★ ★ ★

So it is in organized cost reduction. When we spot an area that shows promise, the thing to do is to GET THE FACTS!

★ ★ ★

Let's:

1. **Observe the operation.**
2. **Get current information.**
3. **Find out what is done—where it is done—when it is done—and who does it.**

★ ★ ★

Let's WORK WITH THE FACTS

Yes, after we get the facts, we have to ANALYZE THE FACTS. It's questions like these that lead to important answers.

★ ★ ★

Just:

1. **Why is this necessary?**
2. **What useful purpose does it serve?**
3. **When should it be done?**
4. **Where should it be done?**
5. **Who should do it?**
6. **How is the best way to do it?**

★ ★ ★

How can we develop a better method? Think about facts and reasons—

★ ★ ★

The question WHY leads to action to eliminate; WHERE suggests change of place and combination; WHEN indicates the change of sequence and combination; WHO leads to reassigning of duties and combining; and HOW dictates that we simplify.

★ ★ ★

In each case our questions lead to the habit of trying to specify the better method.

★ ★ ★

I turn to the next question, which deals with the final step in the organized approach to cost reduction — that of installing the better method.

★ ★ ★

Here we have it. Check effect of safety which brings to mind our safety and medical people, possibly our air and stream pollution people. Check costs; this brings to mind the Accounting Department and Industrial Engineering Department; the thought of quality suggests the Metallurgical Department or the Purchasing Department; while related operations recall the assistance that can be offered by the Traffic Department, Engineering Department, as well as Sales Department and all the other services existing in our companies.

★ ★ ★

In a like manner, the Industrial Relations Department and the Industrial Engineering Department and the Accounting Department can be very helpful when we check the impact on classification, incentives, personnel moves, training the operator, labor agreements and labor agreement revisions.

★ ★ ★

In considering these six points, we are recognizing these two problems.

★ ★ ★

The two major problems in the installation of a better method can be reduced to these: **the human problem.** The natural human tendency is to resist change, to resent criticism.

★ ★ ★

There are ways of getting people to do things and there are ways of getting them so infuriated or riled up that they won't do the very things they would be glad to do under different circumstances.

★ ★ ★

The second area of problems, of course, is that involving technical aspects. To both of these problems each of you has access to some solid, effective assistance.

★ ★ ★

To get these answers GET STAFF HELP.

★ ★ ★

Let's get down to cases. Our thinking is clear, but, just where do we start? How do we go about selecting the area of cost reduction?

★ ★ ★

Well, usually the things that bother us lead to potential cost reduction. Such annoyances include, ineffective use of manpower, bottleneck situations, excessive delays, hazardous conditions, poor material utilization, excessive maintenance costs or difficult working conditions.

★ ★ ★

Such soft spots are often quite apparent in actual operating costs. Let's look at budgets or standard costs. Here are some of the items that make up the hourly costs for an operation in the Cold Roll.

★ ★ ★

The investigation of the guide problem came about as a result of the Foreman in a Cold Roll Strip Department reviewing the high cost of edge guides on a large Four Stand Train Set.

★ ★ ★

This equipment, a large Train Set, produces approximately 12,500 tons of cold rolled strip each month. The material supplied to this mill is hot rolled strip in widths up to 26″ and up to .125″ in thickness, which is reduced in one continuous pass through the four stands to finished thickness. The hot mill strip when it

arrives at the mill has wavy or broken edges and is not of constant width, consequently the leading edge of the strip must be guided into the rolls of each of the four stands of the Train Set. In this equipment there are two guides per stand making a total of eight guides required for the Train Set.

★ ★ ★

These guides are castings made of bronze. This material is softer than steel, consequently as the strip passes between the guides the edges wear a groove into the guides. When the groove becomes excessively deep the guide is removed from the mill and replaced with a new one, the old ones are discarded and when enough guides are accumulated they are sold as scrap to an outside foundry.

★ ★ ★

The cost of the guides is quite high because the guides are purchased from the foundry for $.50 per lb. and after being used are returned to the foundry as scrap which is valued at $.14 per lb. The net cost is $.36 per lb. for each lb. of bronze used. Each guide used in the Train Set weighs 18 pounds, which means the Train Set contains 144 pounds of bronze. Guide usage amounted to approximately 2,000 guides per year.

★ ★ ★

Welding the groove shut seemed to be a quick method of salvaging the guides. They can be electric arc welded in one-half hour and required 1/2 lb. of welding rod per guide for laying weld 36″ in length. The resulting reduction in cost for the edge guides is 70%.

★ ★ ★

The welding does not alter the physical appearance of the guides nor does it change the wearing qualities of the guide. In fact, because of the rapid cooling of the weld, a harder material results, which improves the resistance to wear.

★ ★ ★

Description of Physical Standard	Per Earned Equip. Hour Quantity		$ Rate
Electricity A.C.	.1823	MKWH	2.391
D.C.	.00304	MKWH	.050
Water Industrial	.000191	MM Gals	.004
Total Utilities			2.445
Sundry Operating Parts - Rolls			9.300
Work Roll 10-5/8" x 32"	5.833	Lbs	4.970
Back Up Rolls 21-1/2" x 32"	12.660	Lbs	4.330
Credit Scrap Operating Parts			
Heavy Melting Scrap	(17.901)	Lbs	(.279)
Turnings & Borings Scrap	(.562)	Lbs	(.006)
Sundry Operating Parts - Serv. Chg.			1.338
Resp. 0116 - Assigned Mtce. - C.R.	.0027	Hrs	.009
Resp. 1641 - Roll Shop	.2870	Hrs	1.329
Oils & Greases			1.474
All Other Processing Supplies			
Band Wire	9.4	Lbs	.514
Lubricants			.403
Roll Guides (Bronze)	5.97	Lbs	2.715
All Other Oper. & Serv. Tools			.076
Oper. & Serv. Tools - Serv. Chgs.	.1300	Hrs	.405
Resp. 0102 - Machine Shop	.0106	Hrs	.033
Resp. 0104 - Struct. & Weld. Shop	.0477	Hrs	.139
Resp. 0106 - Carp. & Paint Shop	.0425	Hrs	.135
Resp. 0116 - Assigned Mtce. - C.R.	.0292	Hrs	.098
Misc. Supplies N.O.S.			1.374
Total Tools & Operating Supplies			17.314
Transp. Serv. Charges			
Resp. 1640 - C.R. Tractors	.2300	Hrs	1.375

Table I

The plan of attack is a simple everyday philosophy, that can be used by everybody. It is an action pattern that everyone uses every time a decision is made. I like to consider:

1. **Determine area which needs improvement (LOOK)**
2. **Get the facts (SEE)**
3. **Analyze the facts (THINK)**
4. **Develop a better method (DECIDE)**
5. **Install the better method (ACT)**

And thus we have it; **LOOK—SEE—THINK—DECIDE—ACT.**

★ ★ ★

This general philosophy can handle any test we put to it.

★ ★ ★

The questioning attitude not only gives a tool to determine the areas which need improvement, but it also helps us analyze the facts to determine the better condition.

★ ★ ★

I mentioned earlier that it is necessary to analyze the facts. **WHY** is this necessary? **WHAT** useful purpose does it serve? **WHERE** should it be done? **WHO** should do it? **HOW** is the best way to do it?

★ ★ ★

Most of us are acquainted with some person of whom we generally say, "He certainly has an analytical type of mind." We envy this person's ability to see through things and come out with the conclusions and answers that are "right on the beam", and we wonder why we have not been similarly blessed with the ability to analyze.

★ ★ ★

Let's digress for a moment and consider this "analytical mind". **WHAT** does he do that we don't do? If we observe closely, we find that much of his thinking consists of **QUESTIONS.**

★ ★ ★

This man does not take anything for granted. He is not afraid to ask questions. He is continually thinking constructively, putting the facts together in their proper relationship with each other and arriving at conclusions that are sound.

★ ★ ★

In the same manner people became curious about the way welded fabric is loaded in gondola cars. Such questions were asked as these. Why are the rolls so arranged? What about lateral or vertical ar-

rangement? Can an arrangement be devised to lessen all the strapping shown?

★ ★ ★

In this case the bands are threaded through the cores of the rolls of fabric. Further, bands must be threaded through the side near the ends of outside rolls and bands placed around the center of each pile and threaded through the outside rolls in each roll above the car side. This method of loading necessitates the use of no less than 55 bands.

★ ★ ★

Now let us take a load of fabric which is typical of those now moving out of the plant. It is simplicity itself. By rearrangement of the rolls, two bands, along with four 4 x 4's and four car hooks adequately anchors the load. A considerable saving of time and labor has been brought about by the elimination of 53 extra bands which were required with the traditional method of loading.

★ ★ ★

The Traffic Department was able to persuade the Association of American Railroads to accept this method of loading as standard and to incorporate it in their rule book. Whereas we were following this procedure under a temporary Railroad permit, we now have a full approval of the practice and are following it regularly.

★ ★ ★

Let's carry the organized approach into a more complicated problem.

(Slide Shown: Plant Layout—Present Method)

★ ★ ★

Take a finishing and shipping department which is inadequate in size for the growing volume of material being handled.

★ ★ ★

Here we see a full storage condition which prevails most of the time in this department. Some obvious questions arise immediately. Why is this a problem? Can you visualize more material squeezing through this department should the plant increase its production, say 10%?

★ ★ ★

Obviously it is a bottleneck! Well, what are some of the things we see that makes it look like a bottleneck?

★ ★ ★

For one thing there is a snarl of two-way traffic in the single, narrow aisle. Weighing scales are located so as to congest the intersection of east-west and north-south traffic flow.

★ ★ ★

Along the wall is a total assignment of six three-man bundling crews/turn. Working a two turn operation their output averaged 240 tons/day.

★ ★ ★

When you consider them, you're impressed with the fact that they're using brute force—doing it the same way they have been doing it for the past 25 years in the steel business, with the possible exception that they have a hoist or so to help them out.

★ ★ ★

What is it costing to do some of the various activities? For instance, what is the labor cost of bundling? What is the cost per square foot of our storage area consumed? What is the cost of transporting materials from the time they reach the department until the time they are on their way to the customer? What is the actual cost of rehandling material?

★ ★ ★

In regard to the scale location, what is the ratio of truck shipments to rail shipments? Has there been any change in this ratio over any long time experience? How many turns are worked to create this condition? Are there any peak periods in loading and shipping? What relation do they bear to the storage problem? Considering the drudgery in the work, what hiring problems are experienced? How many pounds of product is this manual method of bundling turning out per man?

★ ★ ★

It turns out that this department employs 36 men on two turns to bundle material produced by a plant at 80% of its capacity. If we are to meet current peak operating levels, production must be accelerated, as there is no room for additional bundling equipment and a third turn is impracticable.

★ ★ ★

And thus one by one, as we look for the answers to our questions, we find the opportunity to begin to play with the facts we have gathered to see what we can do.

★ ★ ★

Here I would like to digress for a moment and call to your attention this very picture we're looking at. It is a picture of a model of this department we have been talking about. As we assemble our facts on this scale model, we can move the various components around with very little effort to see what effect they might have.

★ ★ ★

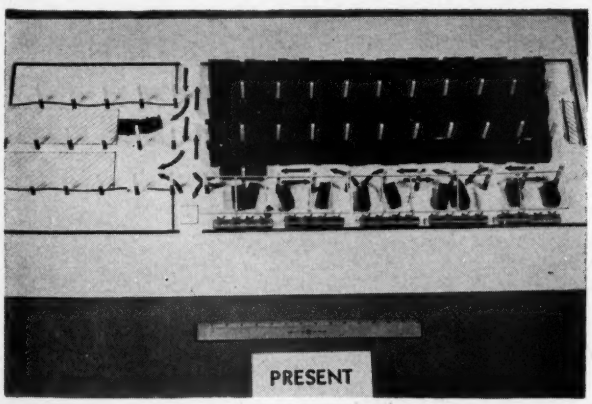


Figure 1. Present Layout.

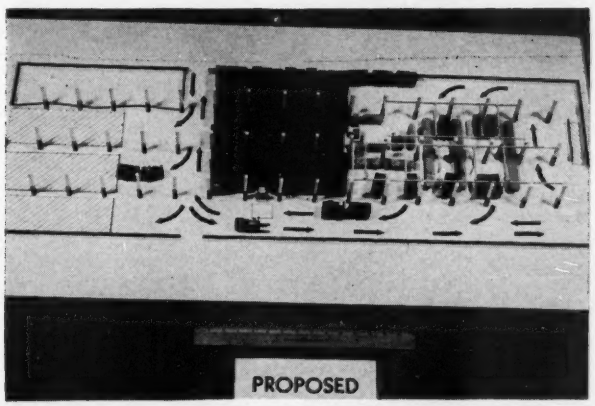


Figure 2. Proposed Layout.

In analyzing the problem by use of this model, we find that for a relatively few dollars we can study scores of ways of attacking the problem. In actual practice it would cost, for instance, $5,000 to move this scale from here to say over here,—only perhaps to find out that the move wasn't as efficient as it might have been.

★ ★ ★

And so, as we begin to play chess with our facts, we draw upon the personnel facilities of the various departments. In this instance, as we face questions of how to increase productivity per man, our quest leads us into the realm of the Packaging Committee.

★ ★ ★

They tell us that a semi-automatic bundling machine was the answer to a problem in a plant which is very similar to our problem. Already, our productivity questions begin to receive an answer. Thus it goes with our traffic problems, our material flow problems, our storage problems, and some of our industrial relations problems.

★ ★ ★

Soon a better method begins to evolve and takes real form here in our model. Here is how the answers begin to shape up and how our department will look in actual operation.

(Slide Shown: Layout—Proposed)

★ ★ ★

On this proposed plan we see the problem worked out on the basis of having analyzed the facts we gathered without impeding actual production in the department.

★ ★ ★

Quickly visible to the eye is the existence of a wider aisle, making possible full, two-way traffic flow and relieving congestion. Note also that the bundling crosses have been replaced by three modern automatic bundling lines over here on the right. Each line is manned by a three man crew. These machines reduce, to a marked extent, the arduous labor of the old method.

★ ★ ★

A few old-time bundling crosses are kept in the department to take care of some specialty jobs not adaptable to the new equipment. A three man crew performs the hand bundling required.

★ ★ ★

The smoothness of the flow pattern is easily seen. The stock comes in at one end, enters the bundling lines, and pulls out on the other side to the nearby scale and into storage in a clean operation. Confusion is minimized. Excess handling of stock has been greatly reduced.

★ ★ ★

By relocating offices to a less congested area, a third truck well is added to allow increased truck shipments. The scale, relocated to fit the traffic flow, is of the printomatic type. The tractor operator merely inserts a ticket in the scale and has recorded thereon the weight of his load, thus obviating the need for a weigher.

★ ★ ★

In addition to speeding up the flow of material within the department itself, these changes accelerate loading for shipment, and can eventually reduce the size of the shipping crew.

★ ★ ★

Now let's discuss the details of step #5 "Install the Better Method".

★ ★ ★

Needless to say, if we spend the effort and time required by the first four steps, if we develop a new method but stop there, we are not better off than before. We all know men who carry an idea just so far and then lose interest and drop it. In the long run we measure other people by results, and we are being tested in the same way. Therefore, once an improvement is developed, let's put it to use.

★ ★ ★

To install any plan a real effort must be made to smooth the way and to get past snags—some of which are hidden from our view.

★ ★ ★

We have all seen good plans that failed because they were installed too fast, or at the wrong time, or where something was overlooked that could have been fixed beforehand. When an improvement is installed, it will call for help of a lot of people to make it go; let's not overlook the part they play.

★ ★ ★

Here is a check-off list of the most likely sources of trouble.

★ ★ ★

Costs—should be checked so that the net savings can be calculated to guard against an unforeseen increase in costs from the new method. This is particularly true when expenditures are required for new equipment or gadgets. There may be changes in quality of production which should be investigated, or

(*Please turn to page* 1311)

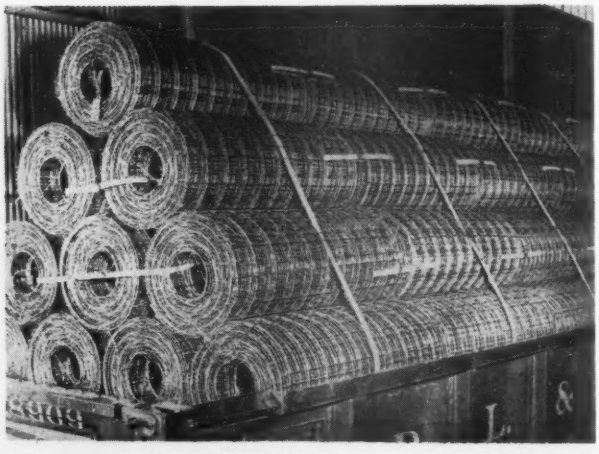


Figure 3. Old Method.

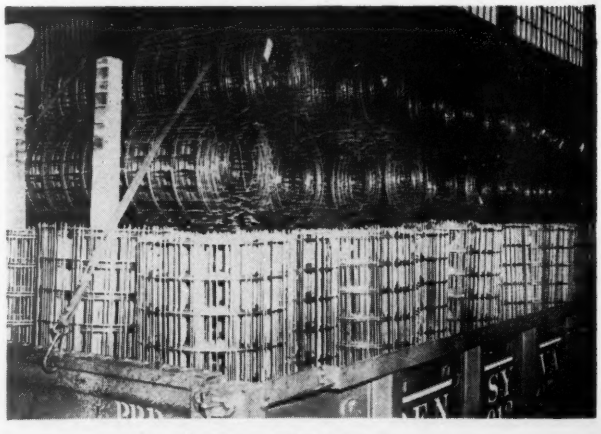
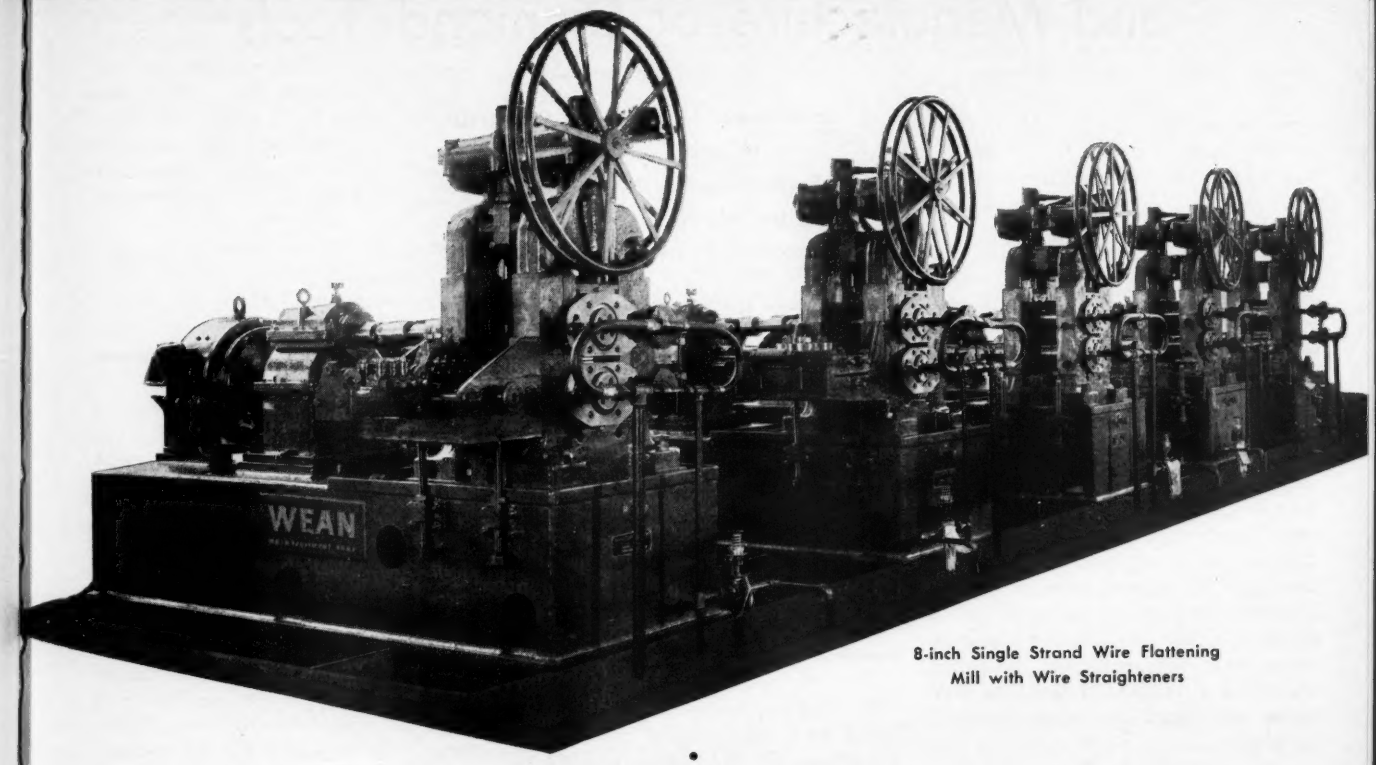


Figure 4. New Method.

Wean



8-inch Single Strand Wire Flattening Mill with Wire Straighteners

A COMPLETE ENGINEERING SERVICE FOR WIRE MILL INSTALLATIONS

Complete Installations for Electro Galvanizing, Hot Dip Galvanizing, Patenting, Tinning, Wire Flattening, Nail Galvanizing and Blueing.

Complete Equipment for the Manufacture of Hexagon Netting, Hinge Joint Fence and Barbed Wire.

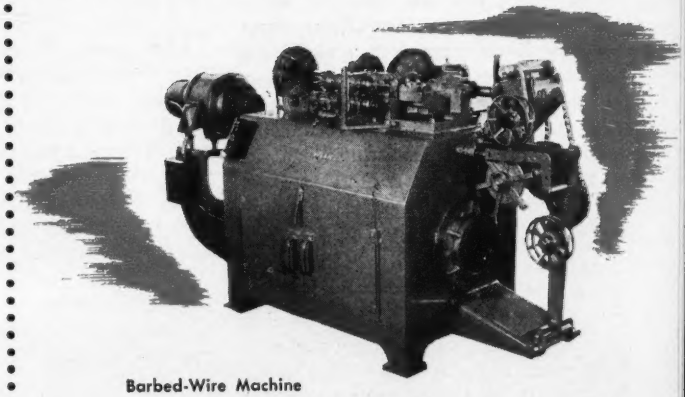
CHECK WEAN FIRST FOR WIRE MILL EQUIPMENT

STRIP MACHINERY

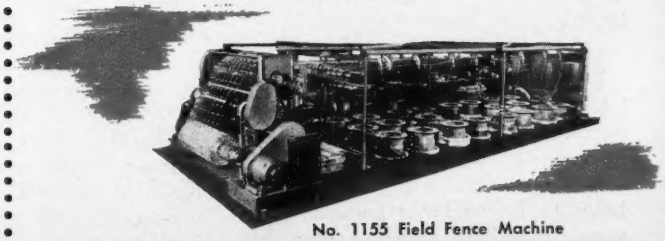
Slitting Installations. Cut to Length Installations. Bearing Metal Coating Installations. Two-Hi Rolling Mill Applications. Strip Grinding Installations. Levelers, Uncoilers, Pinch Rolls, Shears for Strip Processing lines.

WEAN EQUIPMENT CORPORATION

22800 LAKELAND BLVD. • CLEVELAND, OHIO



Barbed-Wire Machine



No. 1155 Field Fence Machine

Wean *Equipment Corporation*

CLEVELAND, OHIO

The Use of Crystallography in the Development and Manufacture of Diamond Tools

by G. E. Shubrooks, Manager of Research
and
H. P. Gifford, Supervisor, Crystal Tool Laboratory
Hamilton Watch Company
Lancaster, Pennsylvania

In this article the authors show that it is possible to triple the life of diamond tools, which includes wire drawing dies, through a proper selection and orientation of the stones, the latter involving crystallography: This is not just a matter of theory at Hamilton Watch, for the company has been analyzing the crystal structure of diamonds with excellent results for several years. It might be mentioned that Hamilton has a small department in which it makes it own alloy steels, and a wire mill for drawing wire for springs, pinions and other watch parts. Equipment also includes rolling mill facilities.

The Hamilton Watch Company has been using diamond tools and dies in the fabrication of watch parts for many years. Diamond wheel dressers were first used and then gradually a few single point diamond tools replaced sapphire cutters which had been used in simple stripping operations on brass jewel settings. Eventually all the sapphire tools were replaced with diamond tools and a number of diamond dies were purchased for wire drawing purposes.

★ ★ ★

Prior to 1935, all diamond tools and dies used at Hamilton were purchased and when it was required they were returned to the supplier for repolishing or repair. This meant that a large inventory of diamond tools had to be maintained because of the many tools which were in use, in addition to reserve tools and those being repaired.

★ ★ ★

The art of diamond cutting and faceting was, and in many companies still is, a skill that few men possess; and years ago, in order to master the art, it was necessary to spend many years of apprenticeship under the old guild type of system.

★ ★ ★

During 1935 a diamond tool lapidist was employed by Hamilton to perform all the cutting and repolishing on diamond tools. This meant that the inventory of tools did not have to be as large because each repair could be made in our own plant within a few days time.

★ ★ ★

In 1941 a planned program of diamond tool development was started in which all the latest laboratory equipment was purchased and used.

★ ★ ★

This was advisable because in manufacturing parts for the modern jeweled watch, it is standard practice to hold tolerances to 0.0001 inch and in some parts the tolerances are measured minutely to 0.00001 inch. With proper diamond tools, it is possible to hold these tolerances and also to reduce the number of operations, thus effectively reducing costs. However, it is not intended to infer that all accurate tolerances are maintained by the use of diamond tools alone.

★ ★ ★

As the use of diamond tools increased at Hamilton, and the need for longer tool life became apparent, an accompanying dissatisfaction with the old methods of producing the tools was experienced. It was believed that somewhere there must be scientifically trained men who could shed some light on the mysteries and secrets of diamond tool making.

★ ★ ★

While discussing these matters with technical experts, it was learned that crystallography would be extremely helpful as it is the science which deals with the nature of crystals, their origin and internal structure and external forms.

★ ★ ★

Therefore, as stated earlier—the Crystallography and Abrasive Research Laboratory was established in 1941 as a section of our Research Division. The duties of this laboratory were to study all the crystalline materials used in the watch industry, whether they be used as watch parts or as tools for fabricating watch parts or as abrasives for finishing watch parts. The equipment which was purchased for this new laboratory included a petrographic microscope, binocular microscope, an x-ray diffraction unit, a two-circle goniometer and five diamond polishing or faceting machines.

★ ★ ★

This laboratory has now evolved into what is known as the Crystal Tool Laboratory, and it has been greatly expanded in the past ten years. There are now two diamond tool makers, two diamond and carbide die makers, one chemist and one crystallographer. The laboratory is responsible for the development, manufacture and repair of all diamond tools and dies used in the factory and in some cases special tools for other companies are developed and manufactured. Figures 1 and 2 show two views of the present Crystal Tool Laboratory.

★ ★ ★

Preliminary work in the study of the diamond used as an industrial tool naturally led into the study of the internal structure of the crystal. With the use of the x-ray diffraction unit, it is possible to study any diamond and determine its easiest polishing grain as well as the orientation in relation to the two, three and four point grain. From the x-ray pattern, it is possible to make a "blue-print" of the diamond and determine its exact orientation to an accuracy of one degree of arc.

★ ★ ★

A survey was made of all the diamond tools used at Hamilton and a definite orientation was established for each tool, depending upon its use. Data were collected on a number of diamond tools randomly oriented in order to assist with this study. In addition all tools were x-rayed and their exact orientations were determined. Those orientations producing the best working results were selected as preferred for each particular type of work.

★ ★ ★

One advantage in using exact orientations is that each diamond tool of each type when being repaired will cut or polish in the same direction. When the tool is returned for repairs, no time is lost in determining the "best running grain".

★ ★ ★

In selecting the uncut diamond from raw stock for a tool, it must be free from flaws and cleavage planes in the working areas and have the proper weight and shape. All of these factors are further considered when the orientation is determined for each tool and in setting the diamond in a holder, care must be exercised in selecting the type of holder because of the necessity for rigidity. Some diamonds are not mounted in conventional type holders but are mounted in cleavers cement or in shellac.

★ ★ ★

Examples of how this research has paid off can be stated in the histories of several outstanding types of tools.

★ ★ ★

In cutting beryllium-copper balance wheels, an average of 13,000 pieces is experienced before excessive wear on the diamond tool occurs. Eight diamond tools are used to cut a balance wheel—performing such operations as facing the arm, facing the rim, chamfering the rim, finishing the outside diameter and counter-sinking the screw holes. The above average of 13,000 pieces per polish has been improved to 40,000 pieces with tools that have been properly studied. Figure 3 shows these eight diamond tools.

★ ★ ★

Other instances of outstanding performances as a result of proper orientation are indicated as follows:

1. **Diamonds** used to bevel the heads on gold screws have produced 200,000 screws on one polish. Shown in Figure 4.
2. **Diamonds** used to strip brass jewel settings have produced 50,000 settings per polish. Shown in Figure 5.
3. **In the** production of one stainless steel part, an average of 50,000 pieces is common and some diamonds are still in use that have produced as high as 250,000 pieces.
4. **One diamond** used to cut gold screws was in service six months without being repolished.
5. **Another** diamond used to bevel nickel silver bridges was in service for one year before requiring a repolish.

★ ★ ★

The work to date has not covered preferred orientations for round diamond dies inasmuch as this type of die is not manufactured here. These dies are purchased but the Crystal Tool Laboratory now does all the recutting and polishing on these dies. Records have been maintained for the past year on a single set of nineteen round dies which are being used to draw .0035" highly alloyed wire. Inasmuch as this study is not complete, it will not be possible at the present time to quote specific figures on production records obtained from the randomly oriented stones.

★ ★ ★

All repairs to the diamond tools and dies used in the factory are made in the Crystal Tool Laboratory. Approximately 3,200 diamond tools and dies were made or repaired during 1951. This figure is a thirty-five per cent increase over the 1950 total which was a peak year. The increase is due primarily to the development of specialized

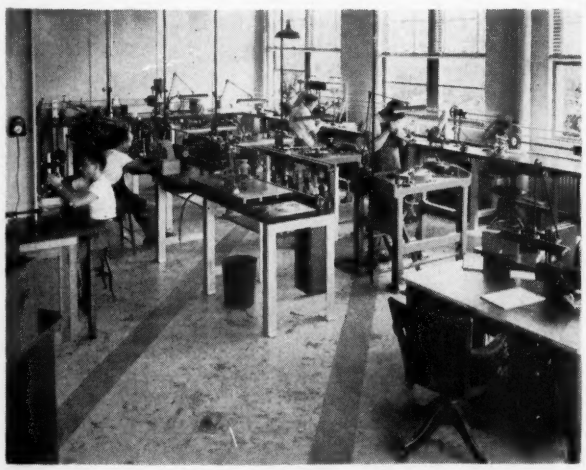


Figure 1
Crystal Tool Laboratory showing four diamond polishing units, and equipment used to open, polish and finish round diamond and carbide dies.

Figure 2
Crystal Tool Laboratory showing the X-ray diffraction equipment used in the determination of orientations of diamonds for single point tools. Dark room in the background.

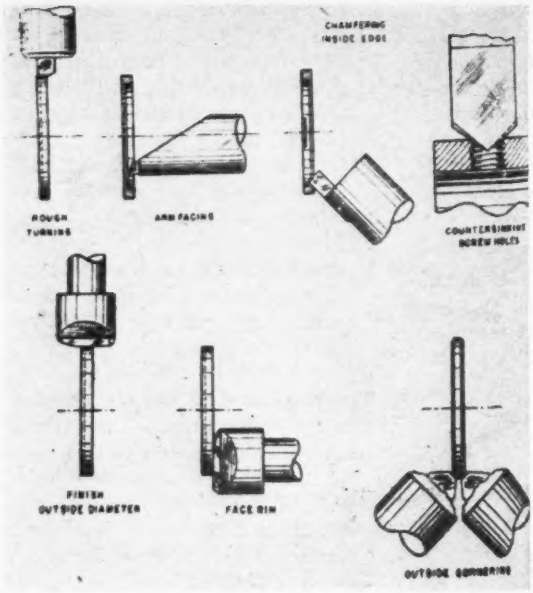


Figure 3

The eight diamond tools used in the fabrication of balance wheels for watches.

diamond impregnated laps which are in great demand by our Machine Shop and Small Tool Departments. A series of these laps are shown in Figure 6.

★ ★ ★

These laps are metal bonded with a high concentrate of diamond powder of one of several different sizes. They are used in the internal grinding and lapping of steel or carbide tools and dies. The major portion of these laps are less than .062" in diameter but they can be produced in diameters ranging from .030" to .250". Larger sizes up to two inches in diameter have been produced for special purposes. The increased demand for these diamond laps has stemmed from the fact that greater use is being made of "hard-to-cut-and-polish" materials such as cemented carbides. Diamond laps are most satisfactory for the rapid fabrication of tools made from cemented carbides.

★ ★ ★

It is not known if many other companies have resorted to methods such as these in order to develop better diamond tools within their plants but it is reasonably certain that industry does not contain too many laboratories of this type. A large amount of money has been spent on the development work and it is believed that the savings through the use of properly oriented diamond tools and the satisfactory results obtained from our diamond laps have paid us dividends on the original investment.

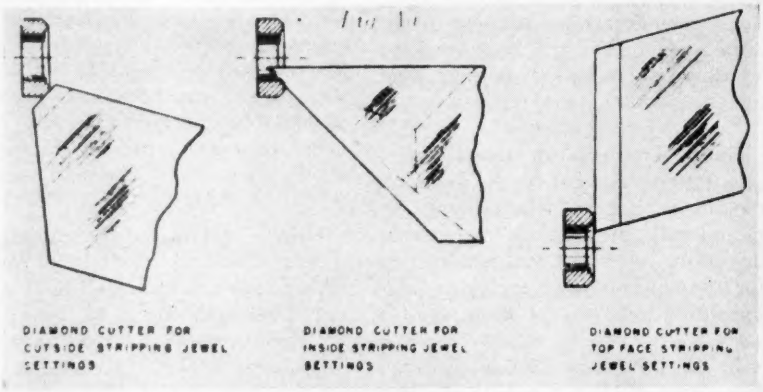

DIAMOND CUTTER FOR OUTSIDE STRIPPING JEWEL SETTINGS
DIAMOND CUTTER FOR INSIDE STRIPPING JEWEL SETTINGS
DIAMOND CUTTER FOR TOP FACE STRIPPING JEWEL SETTINGS

Figure 5

The three single point diamond tools used in a plunge cut to finish jewel setting for watches.

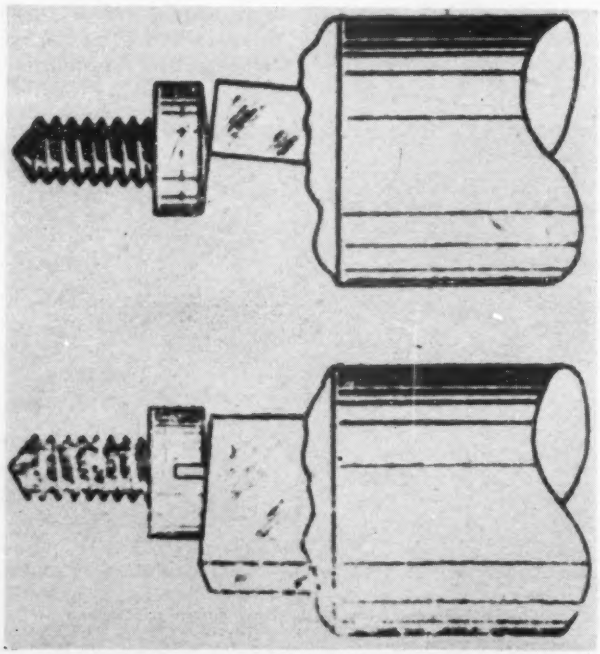


Figure 4

The diamond tool used to form the heads of gold balance screws used in watches.

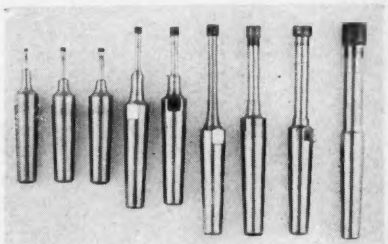


Figure 6

Diamond impregnated laps with a metal bond. The laps are formed on a standard taper or straight shank, and range in diameter from .031" to .250".

Silver Wire—Its Cold Working And Annealing

by M. Baliki, Dr. Ing.
Professor of Metallurgical Engineering
Polytechnic Institute of Brooklyn
Brooklyn, New York

This paper is based on experimental work, "Hardening and Re-annealing Cycle of Pure Silver", recently completed in the laboratories of the Institute by Dr. Baliki and Goldye Leeds.

In our days the ancient art of wire making has been converted into an extensive chapter of modern Science of Metals. The effort in this field of experimental and theoretical metallurgists, as well as physicists, has accumulated a considerable knowledge of facts and relationships that concern the basic and secondary phenomena and factors present in wire-making operations. This knowledge, considerable as it is, is not complete and research work continues to uncover facts and data of both practical and theoretical importance. The progress along all these lines is naturally closely watched by the wire industry as it furnishes directly or indirectly ways and means for improving the quality and the volume of production.

★ ★ ★

The present piece of work was not designed to be of immediate, direct assistance to industrial practice. Nevertheless, it contains a great deal of information that should be of value to men engaged in designing and executing the commercial production of metal wire. In the first place, it contains a somewhat exemplary picture of property changes that occur in the work-hardening-annealing cycle — the basic sequence in wire making. Secondly, it provides a proof that modern Physical Metallurgy has been so advanced that it can quantitatively account for the changes in properties that occur on annealing of work-hardened wires. The fact, that it is possible to correlate mathematically structure or property with temperature and time of annealing, appears to be of some far reaching consequences. Apart from providing a proof that our knowledge of phenomena that operate on annealing is correct and adequate, it provides ground for formal mathematical analysis of many problems pertaining to annealing practice. That such an analysis may suggest some advantageous, novel variants of annealing appears to be highly probable.

Technical Introduction

Converting a metal bar into wire is usually a series of drawing and annealing operations. The drawing part of each such sequence, may consist of one or a number of operations. These resort to pulling a bar or a wire through a suitably shaped die, normally having a smaller cross-section than that of the rod. By a draw, or a series of them, the shape of the cross-section and/or its area is changed. Apart from secondary phenomena, such as friction, generation of heat and localized welding of wire to the die, the wire drawing is accomplished by the main phenomenon, best described as "cold, plastic deformation". Plastic deformation, hot—, if performed at high temperatures, or cold—, when performed at or near room temperatures, is not a simple process. It is known to be composed of a number of singular mechanisms which may be enumerated as follows: a) subdivision of original crystals into crystallites by process of mechanical twinning, b) subdivisions of original crystals into crystallites by mechanical slip along crystallographic planes and in the crystallographic directions most closely packed with atoms, c) subdivision of the original crystals into crystallites by mechanical slip combined with rotation d) breaking and displacement of original crystal boundaries and e) displacement of original crystals without their subdivision, along the crystal boundaries. These singular mechanisms contribute to the final deformation in a manner that as yet is not too well known. The blending of these mechanisms usually varies from metal to metal and also with circumstances under which the plastic deformation takes place, such as the temperature, the per cent reduction of area which the deformation is producing, etc., etc.

★ ★ ★

As a result of cold-plastic deformation, the original metal structure undergoes some changes. The crystals become subdivided into crystallites some of which assume "preferred" orientations. Single crystallites or, more often whole groups of them, are placed under residual positive or negative stresses which subject their lattices to tensional or compressive strains. Such strains, although confined to much smaller parts of the lattice are set up on and in the vicinity of "used up" gliding and rotational planes, that is, in places of contact between the crystallites. The structural changes just enumerated are cumulatively described as cold-worked or, work-hardened metal structure. Depending upon the severity of cold-plastic

deformation, the metal itself, and its past history,—these structural changes may be present in different stages of advancement.

★ ★ ★

Parallel with structural changes caused by cold, plastic deformation are the changes in the structure-sensitive properties. Of these, mechanical properties such as hardness, yield-point, ultimate stress, per cent elongation, are more responsive in that respect than are the other properties. For instance, by severe cold-working of fully soft copper, nickel or iron, their hardness, yield point and ultimate stress may be doubled, while, their electrical resistance may be increased by only 2 or 3 per cent.

★ ★ ★

The hardening of the metals that results from cold-plastic deformation, be it wire drawing or other, is of increasing technical and economical importance. Just by specifying an appropriate reduction of area the metallurgists can alter the "temper" of the original, fully soft metal within wide limits. They are thus able to adapt the basic metal to a variety of applications which call for different specification of mechanical and other properties. The work-hardened metals and alloys, by virtue of their increased elastic limit or yield point have a better stress-carrying capacity than do the same metals and alloys in fully annealed, soft condition. Their employment as materials of construction, therefore, often permits considerable saving of weight and cost. It also conserves metals, a feature of considerable value in case of metals like copper, that are short in supply. The above outlined benefits that are to be derived from the employment of work-hardened metals cannot be realized in all metals and alloys. This is because some of these, cannot retain the work-hardened structure at ambient or slightly higher working temperatures. Such metals are said to have a low thermal stability of their work-hardened state and thus are prone to self-annealing. Low melting metals such as tin, lead belong to this category. High melting point metals and alloys usually have a high thermal stability of their work-hardened state, and because of that they can be used advantageously in work-hardened condition. The economies and technical benefits inherent in application of metals in work-hardened condition are secured at some cost. This involves expenditure for stronger machinery, greater power consumption as well as greater wear of dies and other forming tools.

★ ★ ★

Apart from the advantageous side, the work-hardening that follows every cold-plastic forming operation, offers some disadvantages. These occur mostly in preliminary breakdown operations and in the production of dead-soft wire. There, the loss of ductility on cold-drawing, leads to defects and fractures and the increased hardness leads to greater power consumption and greater die wear. The impairing of the metal quality, however, is avoided and power consumption is minimized by an introduction of an annealing operation. This cancels most of the structure changes brought about by cold-working. It is known as intermediate or final annealing, process annealing or rather aptly,—reannealing. In this process we take an advantage of the fact that work-hardened structures in all metals and alloys are basically unstable and disappear on exposure to sufficiently high temperature for an adequately long period of time. Naturally, all structure-sensitive properties on such exposure revert to the levels characteristic of the starting, fully soft material.

★ ★ ★

Production of fine wires of good quality may call for several such cold-drawing-reannealing sequences. A complete knowledge of structure as well as of property level changes on cold drawing and annealing is, therefore, indispensible for proper planning of the processing schedule.

★ ★ ★

The designer is also interested in details of changes that occur during such a cycle. The work-hardening part of it gives him definite information about the relationship between mechanical properties in which he is interested and the per cent reduction, while the reannealing part of the cycle, if properly determined, gives him exact information about the temperature up to which he can employ a given metal without danger of its softening. This temperature, is of course, that of the beginning softening.

★ ★ ★

From the above, it is apparent that detailed knowledge of the property and structure changes on work-hardening and reannealing cycle is of considerable practical value and explains why this topic receives so much attention. It is also of paramount importance for scientific purposes as it provides data necessary for uncovering fundamental knowledge of phenomena that operate in such a cycle.

★ ★ ★

A recent survey of technical literature revealed that silver has not been studied along these lines adequately and that our knowledge of the work-hardening reannealing cycle in this metal is insufficient for both practical and theoretical ends. It was therefore most desirable to fill in this gap by a suitably designed and executed research program.

Material and its Preparation

Since the scientific aspects of the cycle were of prime interest to the author, it was decided to conduct these studies on purest silver commercially available. This silver is also of some interest for applications in the electrical industry. Handy and Harman Company fine silver was selected. It was delivered in the form of a 0.4" dia. bar which at the testing stage, contained: 0.0001-0.001% Cu; 0.0001% Te; together with traces of Pb, Si, Ca, Mg, and Mn. The sequence of preparatory operations to which this bar was subjected has been summarized in Table 1. It may be seen from this table that this procedure yielded a series of wires with the same diameter; each wire being drawn to different reduction. In this way, economies of silver, as well as ideal conditions for comparing the results, have been secured.

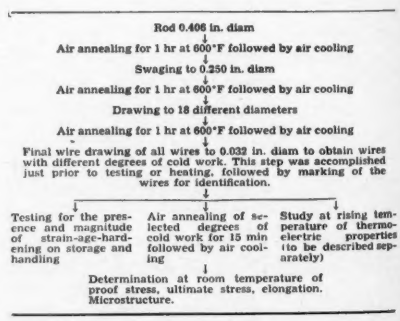

Rod 0.406 in. diam
Air annealing for 1 hr at 600°F followed by air cooling
Swaging to 0.250 in. diam
Air annealing for 1 hr at 600°F followed by air cooling
Drawing to 18 different diameters
Air annealing for 1 hr at 600°F followed by air cooling
Final wire drawing of all wires to 0.032 in. diam to obtain wires with different degrees of cold work. This step was accomplished just prior to testing or heating, followed by marking of the wires for identification.
Testing for the presence and magnitude of strain-age-hardening on storage and handling
Air annealing of selected degrees of cold work for 15 min followed by air cooling
Study at rising temperature of thermoelectric properties (to be described separately)
Determination at room temperature of proof stress, ultimate stress, elongation. Microstructure.

Table I

As highly purified silver is known to be liable to self-anneal, it was advisable to store the silver at the penultimate size until just before testing and annealing. The final drawing was thus always completed immediately before the usage of wire. To avoid recrystallization by friction-heating adequate lubrication and a slow rate of wire drawing was employed. Some check tests, the details of which need not be adduced here, established conclusively that so prepared samples were not affected by exposure to room temperature on handling and brief, unavoidable delays.

Tests

A study of structural changes in general, and those occurring in work-hardening-reannealing cycle in particular can employ either direct or indirect methods. In this work, both direct, microscopic and indirect methods involving studies of some of the properties were employed. In selecting the properties for this purpose, preference was given to those that are known to be "additive", that is such properties that change proportionately with the structure changes. Unavailability of special testing equipment, as well as other considerations narrowed the field to the determination of; ultimate stress and per cent elongation on a 2″ test length from a simple tensile test, proof stress from a cantilever bending test, thermoelectric power and maximum thermoelectric force produced by a thermocouple composed of work-hardened and fully annealed silver wires.

★ ★ ★

The tensile tests were performed in the usually accepted manner on a J. Camillon machine, and the proof-stress in bending was determined with a power driven Tinius Olsen Stiffness Tester of 6 inch-pounds capacity. This involved a determination of the dependence between the bending moment and the angular deflection. By employing the offset method to graphs showing such a relationship, it was possible to find the magnitude of the moment which produced 10° deflection angle in the wire tested. A substitution of this value into the known equation for bending cantilever beams, together with constant values of the beam length and its diameter, ultimately yielded the numerical values of the proof stress.

★ ★ ★

The determination of thermoelectric indexes involved making a thermocouple out of fully annealed, silver wire and of a cold-worked wire; the hot-and-cold-junctions of the couple being secured by mechanical means. After placing the tested hot-junction near that of a carefully calibrated, platinum-platinum-rhodium thermocouple inside a cold electric furnace, this was energized. As the temperature of the furnace increased the readings of the temperature of the hot junction and the E.M.F. generated by it were accurately made by means of a potentiometer. In order to avoid errors due to changing temperature of the cold-junctions, these were kept at melting ice temperature throughout the experiment. The plot of the Thermo-Electric force generated by the silver couple versus the temperature of the hot junction permitted the derivation of the values of the thermoelectric power between room and 100°C as well as values of the maximum thermoelectric force the couple generated. The thermoelectric power, it will be remembered is given by the slope dE/dT of the tangent drawn to the initial, straight line portion of the E.M.F. versus temperature curve.

★ ★ ★

Apart from all the above described primary determinations, the determination of the temperatures of the beginning and that of the end of softening of silver cold-drawn to different per cent of reduction was made.

Experimental Findings

The effect of cold drawing to different reductions on the properties studied is shown in Figure 1. In this figure it may be seen that silver rapidly loses its elongation. This, at 21% reduction, attains a low level of 3.5%. The indexes of practical stress-carrying capacity, namely the proof-stress and ultimate stress, increase with the per cent reduction,—the increase being somewhat steeper in the first stages of plastic deformation (up to 21% reduction), than in the more advanced stages. Both thermoelectric indexes show a similar behavior. The temperatures denoted on the figure as T_1 and T_3 denote the

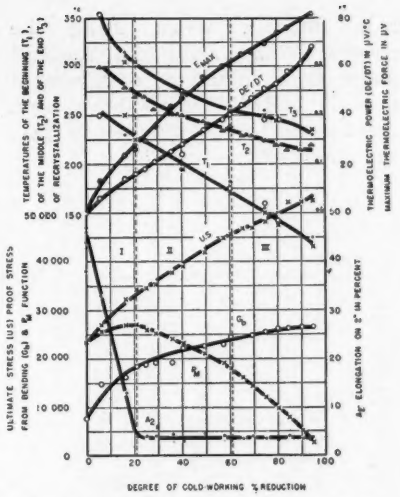


Figure 1. Work-Hardening Characteristics of Pure Silver.
A_2—Elongation on 2″, σb—Proof Stress from bending, U.S.—Ultimate strength, pm—Krupkowski's factor, dE/dT—thermoelectric power of cold-drawn v. annealed silver, $Emax$—Maximum thermoelectric force, T_1, T_3—threshold softening temperatures, T_2—Temperature of the middle of primary recrystallization.

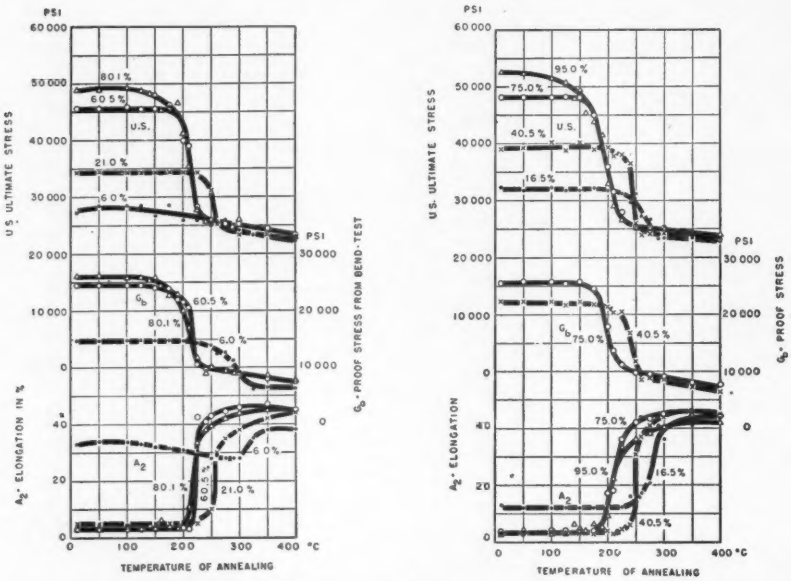
softening range of the silver tested. It can be seen that silver only slightly cold-worked has a high thermal stability of the work-hardened state as evidenced by high values of T_1 that denotes the temperature of the beginning of softening. Such a silver also anneals in a sluggish way which is evidenced by large temperature interval between T_1 and T_3. The limit of practical thermal stability T_1 decreases in silver almost linearly with the degree of cold drawing. At 90% reduction it drops to 120°C. This feature alone, eliminates the strongest of all wires from any applications that may involve working temperatures in the vicinity of 100°C. A wire with 50% reduction of area, which is only a little less good from a stress carrying point of view (see the proof-stress curve) would be a much more suitable one for such application, as it has T_1 by 50° C higher.

★ ★ ★

The softening range, that is the interval between T_1 and T_2 is also large for wires with high per cent reduction, and it is the wires with reductions about 50% that soften in narrowest temperature range. The information concerning the minimum temperatures that must be employed for successful process, or intermediate annealing can be readily determined from the diagram by finding the numerical value of T_3 for a reduction of spe-

cific interest. When using the curves in the diagram for practical purposes, it should be remembered that T_1 and T_3 curves have been determined for 15 minutes holding time at the temperature.

★ ★ ★



Figures 2 and 3. Annealing Characteristics of Pure Silver cold-drawn to reductions indicated. Fig. 2 (left) pertains to wires with 6.0, 21.0, 60.5 and 80. 1% reduction and Fig. 3 (right) pertains to wires with 16.5, 40.5, 75.0 and 05.0% reduction,—annealed in air for 15 minutes.

Figure 2 and 3 illustrate the effect of temperature of annealing on the level of properties studied. It may be seen in these diagrams, that heating for 15 minutes to low temperatures does not affect the property levels imparted by cold drawing. Heating, however, above certain temperature, that is evidently dependent upon the per cent reduction to which the wire has been subjected, brings about some changes. The properties that have been increased by cold-drawing begin to decrease and elongation that has been depressed by cold-working begins to increase.

★ ★ ★

All these changes are symptoms of softening, and it is therefore correct to call the threshold temperatures at which these changes begin: the temperature of beginning softening, T_1, or the upper limit of thermal stability of work-hardened state in the metal. The appearance of first visible equi-axial crystals on direct microscopic examination of samples that just start to reveal some property changes permits the identification of this threshold temperature as being that of the beginning of the recrystallization process, wherewith the subdivided and strained work-hardened metal structure reverts into a stress- and strain-free structure ultimately identical with the polycrystalline structure that was present prior to cold-working.

★ ★ ★

As may be seen in the figures, the change in properties, once started, proceeds in all cases rather rapidly, though not instantaneously. A definite and measurable temperature interval is needed to complete the recrystallization. There is in each case a characteristic threshold temperature, T_3, that signifies the end of softening or end of recrystallization. After this is accomplished, the properties attain a reasonably constant level. The changes in properties beyond this T_3 threshold are known to be due to the growth of some fully annealed crystals at the expense of other, similarly annealed ones—a process known as secondary recrystallization or crystal growth.

★ ★ ★

The representation of results in the manner employed in Figures 2 and 3 does not reveal too well the relationship between the level of property, degree of cold-deformation and the temperature of exposure to the action of heat. For such purpose it is of advantage to employ so called space diagrams as exemplified by Figures 4, 5 and 6. Of these, Figure 4 illustrates such a relationship for Ultimate Stress, Figure 5 for 2″ Elongation and Figure 6 for Proof-Stress. In these diagrams open circles denote the experimentally determined values of properties, while the full circles denote data, the significance of which will be explained later in the paper.

★ ★ ★

It may be seen in Figure 4 that there is no change in the level of ultimate stress of fully soft silver with zero per cent reduction on subsequent heating up to 400°C and that the deviation of experimental points from the average curve is very small. This indicates a good degree of testing accuracy.

★ ★ ★

The ultimate stress as a function of per cent reduction increases along a characteristic line, perhaps more truly shown in Figure 1. The higher is per cent reduction, the lower are the threshold temperatures at which lowering of ultimate stress commences and ends. It may be concluded therefore, that increase in strength and, thus in stress-carrying capacity occurs not only at the expense of ductility, but also at the expense of thermal stability of the work-hardened structure. The diagram clearly reveals that fully annealed silver wires differ in Ultimate Strength depending upon the degree of cold-work they had prior to final annealing. Heavily cold-worked wires have a somewhat higher strength. On direct examination of structure under the microscope this was found to be connected with much smaller crystal size present in such wires. The wires with very small reductions, in conformity with findings on other metals, tended to have a pronounced tendency to excessive crystal growth, that leads to low strength data.

★ ★ ★

The behavior of elongation on work-hardening and annealing that has been shown in Figure 5, confirms the comments quoted above. Silver with 5% reduction on heating to about 200°C shows some lowering of elongation, which at higher temperatures gives way to the restoration of ductility to the fully an-

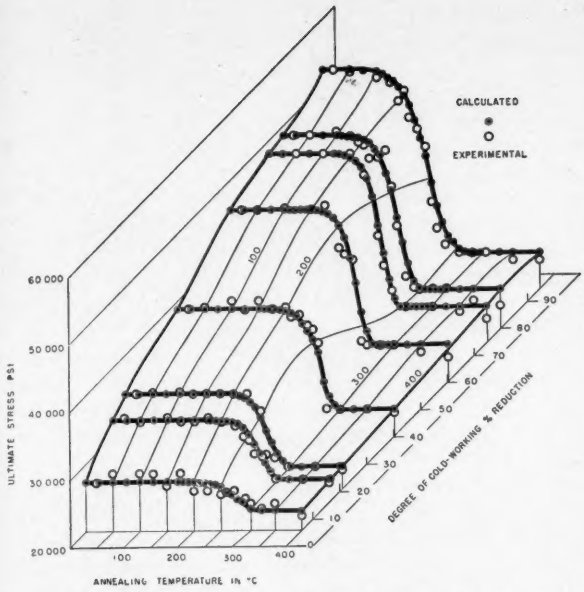


Figure 4. Relationship between Ultimate Strength, Degree of Cold-Work and Temperature of Annealing in Pure Silver. Annealing Time: 15 minutes.

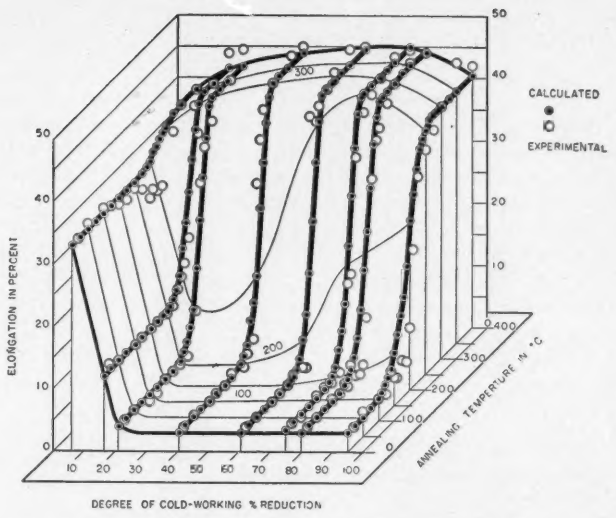


Figure 5. Relationship between Elongation, Degree of Cold-Work and Temperature of Annealing in Pure Silver. Annealing Time: 15 minutes.

nealed level. Due to coarsening of the crystals, the maximum elongation figures obtained with wires of low reduction, are lower than in the case of wires with higher per cent reduction similarly annealed. The reasons for lower elongation encountered on full annealing of wires with reductions greater than 60% are not entirely clear. This effect might be due either to a smaller than optimum crystal size, or which is more likely, to some unfavorable residual crystal orientations. The result of practical value revealed by this diagram is that production of silver with maximum ductility, a grade most suitable for severe plastic forming, should employ reductions higher than 20% and lower than 75% followed by annealing at temperatures between 300 and 400°C. Except for the fact that elongation changes involve, not lowering but an increase, all the observations enumerated earlier in connection with the ultimate stress hold true for elongation. The changes start to occur at the same threshold temperatures T_1 and are completed, within experimental accuracy, at the same temperatures T_2.

★ ★ ★

The behavior of proof stress on annealing may be studied in detail on Figure 6. Except for the differences in number of degrees of cold work studied, and for the differences

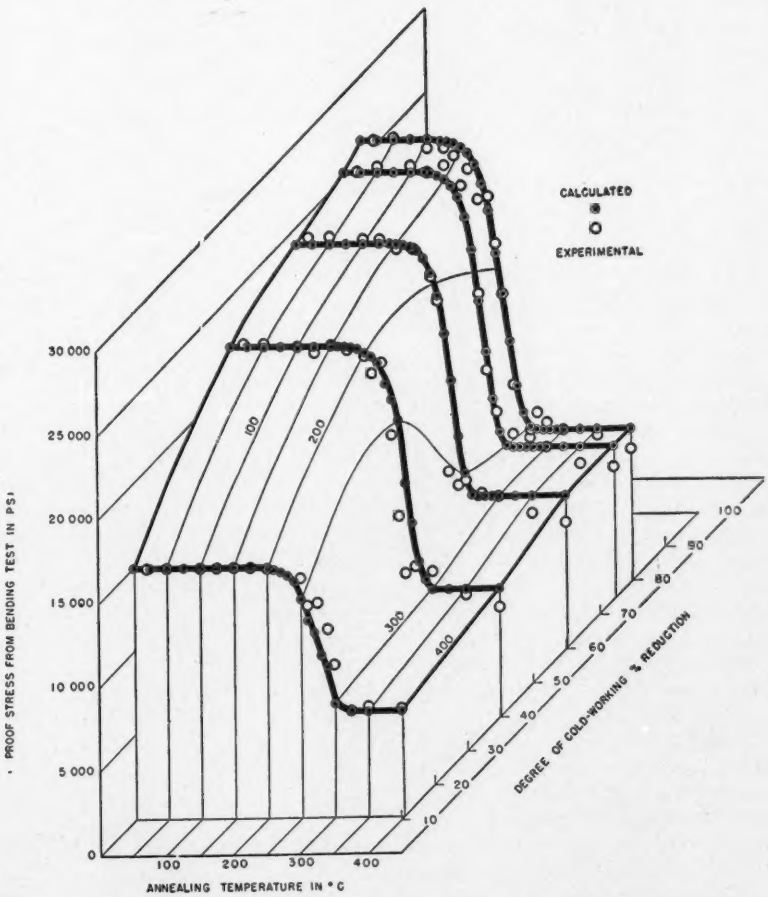


Figure 6. Relationship Between Proof-Stress, Degree of Cold-Work and Annealing Temperature. Annealing Time: 15 Minutes.

in numerical levels, Figures 4 and 6, are extremely similar. The changes due to recrystallization commence and end at the same T_1 and T_3 temperatures as in the two other properties.

★ ★ ★

Direct studies of structural changes due to cold-drawing and subsequent annealing have been done by means of a microscope and resorted to magnification of 500X. Because the changes encountered follow exactly the pattern of changes exhibited by other metals, so well known to practical and research metallurgists, they need not be adduced here. A very brief summary of the findings, however, is in order.

★ ★ ★

On cold-drawing to reductions lower than 21%, that is, in the so called first region of plasticity, the microscope reveals the presence of slip and rotation lines, together with elongation of the originally equiaxial crystals into elongated ones. For reductions higher than 21%, that is in the second and third region of plasticity, the slip lines are so close together that it is impossible to distinguish them. The elongation of original crystals into elongated crystals continues and at medium and large reductions produces the well known fibrous structure.

★ ★ ★

The effect of exposure to the action of heat was studied on wire with 40.5% reduction. Annealing such wire for 15 minutes at temperatures lower than 225°C was without apparent effect on the structure. This does not necessarily mean that structural changes were entirely absent, but rather that etching and resolving of these structural changes was impossible. The first fully annealed, very small crystals were observed after annealing at 225°C. Wires annealed at temperatures higher than that, showed a continuation of the recrystallization, that evidenced itself by the appearance of more equiaxial crystals. Wire annealed at 250° was almost, but not entirely free from the presence of fibrous, work-hardened structure. Heating of the wires above 275 produced a noticeable increase in the size of some of the crystals at the expense of others and a complete absence of fibrous, work-hardened structure.

Elaboration of Results Obtained on Annealed Specimens

It is now generally agreed that on the exposure of work-hardened wires to elevated temperatures only three basic phenomena may be encountered: strain-age-hardening at very low temperatures of annealing, primary recrystallization at somewhat higher temperatures and secondary recrystallization or crystal growth at still higher temperatures of annealing: Strain-age-hardening is believed to be a precipitation process wherewith impurity or alloy atoms precipitate out of solid solution and cause some additional hardening. So far it has been impossible to verify this hypothesis by direct evidence. In some of the alloys and impure metals strain-age-hardening is quite prominent and evidences itself by a rise in hardness, ultimate stress, proof stress, either on long storage at room temperature or after annealing at temperatures only slightly elevated. The presence of strain-aging complicates any quantitative approach to the main process that operates on annealing, namely that of primary recrystallization. In such cases, therefore, it is most advisable to use very pure metals, which have nothing to precipitate out and thus are free from effects of strain-age-hardening. A reference to diagrams 2-6 confirms that silver employed for this work, did not strain-age-harden. Owing to the fact that the experimental evidence gathered reveals quite well the main, primary recrystallization changes together with rather small changes due to secondary recrystallization, or crystal growth, it is possible to apply to the present findings a formal treatment of primary recrystallization, known for some time in Physical Metallurgy[1,2,3] The treatment considers the primary recrystallization, that is the change of distorted, work-hardened structure into stress and strain free, fully annealed ones as an activated process and describes this process by means of the equation:

$$x = 1 - e^{-c,\ t,\ e^{-A/RT}}$$

$$\text{or } \log \frac{1}{1-x} = c,\ t,\ e^{-A/RT}$$

In this expression, x is the fraction of a unit volume of a work-hardened metal sample which has fully recrystallized on subsequent reannealing. Depending on conditions of reannealing, i.e., on temperature of reannealing, T°K and the time in hours, t, x may acquire any value between 0 and 1. The expression also contains A, the activation energy of the recrystallization process, R, the gas constant, and k, the frequency coefficient.

★ ★ ★

For a given metal sample, having the same composition and history, the values A and C are constant. To find numerical values of these it is necessary to plot log-log 1/(1-x) vs. 1/T. The numerical values of x required for this step can be secured from reannealing data such as those that have been obtained from calculations contained in Appendix 1*). The calculation of the amount of the fully annealed state in partially annealed samples x has been obtained from the proportion:

$$x = \frac{(P_z - P_z)}{(P_z - P_a)}$$

when using properties which decrease on reannealing, viz., ultimate stress and proof stress from bending. When a property that increases on reannealing is used, such as elongation, both the numerator and the divisor in the proportion are multiplied by (—1). In the above proportion, P_z designates the value of the property found when testing a fully cold-worked sample without any annealing; P_x, the value of the same property found after annealing for 15 min. at temperature T°K; and P_a, the level of property values found in totally annealed samples.

★ ★ ★

With the exception of the data for z = 21.5 pct all the data assembled in the Appendix have been used and values of log-log 1/(1-x) calculated. These, whether derived from the values of ultimate stress, proof stress, or elongation of a given percentage of reduction of the wire,

***For Appendix 1 order Document 3360 from American Documentation Institute, 1719 N St., N.W., Washington 6, D. C., remitting $1.00 for microfilm (images 1 in. high on standard 35 mm motion picture film) or $1.00 for photocopies (6x8 in.) readable without optical aid.**

(*Please turn to page* 1313)

DISCUSSION OF ALUMINUM CONDUCTOR CONNECTORS

by H. W. Biskeborn, Technical Director
Kaiser Aluminum & Chemical Corporation
Newark, Ohio

A summary of various views on the aluminum cable connectors in use in this country, as contained in various letters and editorials, is given by the author in this article.

The past months have been significant for the presenting, or publication of a number of papers before our technical societies, and articles in the leading electrical engineering publications.

★ ★ ★

Of the former, the paper presented by R. Baugh before Edison Electric Institute in May was noteworthy for the strong indictment of the inadequacy of the current designs that the connector manufacturers were offering for aluminum-copper overhead line connections. This paper has been the subject of comment in European technical circles, in terms that are not flattering to our engineering talents, and with some cause. Is it sound in practical or experimental determinations to present results obtained from irregular applications or from evidently inadequate designs?

★ ★ ★

The "Electrical Times" (London, England) on July 10 published an editorial comment reading:

"Warning On Aluminum"

"As an overhead line conductor, aluminum can today claim many advantages over copper from the viewpoint of availability and price. Moreover, since it is well established for use in transmission circuits, application to distribution might be thought to entail few engineering problems. One change that does occur, however, is an increase in the number of connections to copper conductors that are necessary.

"Recent reports from America, where the pressure for the replacement of copper by aluminum is greater than here, suggest that the difficulties introduced are more serious than had been expected. The danger of electrolytic corrosion at the bimetal joint is of course, well recognized, but it had been expected that the various methods available for overcoming this would prove sufficiently effective. Indeed, cases have been cited where bolted joints between copper and aluminum on shipboard have given no trouble over a score of years. Now it is suggested that under severe test conditions, corrosion is so rapid that even in comparatively favorable circumstances, there could be joint trouble before the useful life of the conductor is reached. So far these reports are not supported by full test results, which in view of the contrary evidence, are obviously necessary. Arrangements are being made to obtain these, and they will be watched for with close attention by distribution engineers in this country, for whom the problem is also important."

★ ★ ★

This editorial drew a response from Mr. C. H. Ridpath, Chief Engineer of Aluminum Wire and Cable Company Ltd., Port Tennant, Swansea, Wales, in a letter printed in the July 17 issue of the "Electrical Times" of London, England and reads as follows:

"We were very surprised to see from your editorial 'Warning on Aluminum' (issue July 10) that experience with aluminum-copper fittings in America seems to have been very different from that in this country. On turning up the American reports to which your editorial refers, we find the following:

"Amongst the conclusions reached as the result of tests, not even one mentions metal purity. This strange omission makes us wonder if its importance is appreciated and if the fittings on tests were made of the right grade of aluminum or aluminum alloys.

"Some failures were associated with copper or insets sweated into aluminum parallel groove clamps; such fittings are not, as far as we are aware, used in this country. Unless care is taken in manufacture, we know from experience that trouble is likely to occur.

"Other failures occurred with cadmium plated copper split-bolt connectors; such fittings can be excellent as long as the cadmium is intact, but it well known that once the copper becomes exposed, then corrosion of the aluminum can take place. Such fittings are not used for aluminum-copper connections to any great extent in this country. Further failures occurred with copper split-bolt connectors using bi-metallic washers. Here again, such a method is not used in this country.

"The most effective system used here is not even mentioned in the American report. We refer to the keeping dry of the bi-metallic junction by an insulating washer. This system has been used for over 25 years in this country and is standard practice here and on the Continent.

"Based on accelerated exposure tests under the most severe conditions, the Americans' report makes some very sweeping statements and even deduces that Aluminum-copper connections are, therefore, not safe under better conditions and may not last out the life of the conductor. In this country we are a little more suspicious of generalizing from accelerated tests.

"To summarize, it is clear that although failures have occurred with the types of fittings reported in the American tests, there is nothing in these tests to give the least cause for alarm in this country with the different types in use here."

★ ★ ★

On July 18 one of our national magazines came out with a front cover title "Is Aluminum a Gamble?"

★ ★ ★

Some of our European friends experienced bewilderment at this sudden awakening in the U. S. to the problems cited—the same problems that had been resolved on the coasts of England, France, Africa, and India, some twenty and more years ago. It is obvious that the plethora of "problems" cited within recent months, are not motivated by altruism; no more so than the pleas of "not to abuse aluminum". A critical survey will show that the comments may be from individuals that do not have a significant interest in aluminum; nor have they adequate aluminum experience upon which to base their judgment and offer it as unprejudiced.

(*Please turn to page* 1320)

Cold Pressure Welding of Wire

by Edmund D. Sickels, Editor
Wire and Wire Products
Stamford, Connecticut

This article has been compiled from literature that has been issued on the subject of cold pressure welding by the English concern who developed the process, by their sole American licensee, The Koldweld Corporation of New York City and by the Utica Forge and Tool Company of Utica, New York, who are manufacturing the necessary welding tools.

Since the introduction of the process, much interest in it has been evinced; now with suitable wire welding tools available, the wire industry has joined with other fabricators in seeking to learn more about this revolutionary method of joining wires by pressure alone.

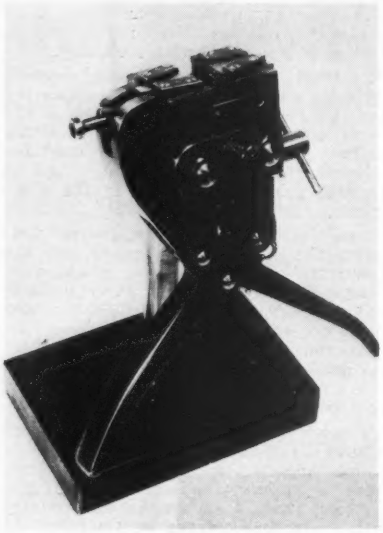


Figure 1. Tool for producing a cold butt weld of wires.

Cold pressure welding is a process of producing a homogeneous joining of metals at room temperatures. No electric current, heat, flux, chemical or other agent is used to facilitate the process. Nor is there any scale to be cleaned away after the weld has been made.

★ ★ ★

The process is a development of the Research Laboratories of The General Electric Company, Ltd. in England, who introduced it first in 1946. However, the recent development of suitable equipment for effecting cold welds has now brought the process to a point of practicable utility.

★ ★ ★

A technical description of what takes place when metals are welded by this process is quoted from an explanation issued by the American licensee's laboratory.

★ ★ ★

"While the actual phenomena taking place in cold pressure welding are not yet fully understood, the following working hypothesis provides a satisfactory explanation of the formation of the solid phase welding bond between the adjoining metal surfaces at the weld spot or area as a result of the applied welding pressure. Although there may be some

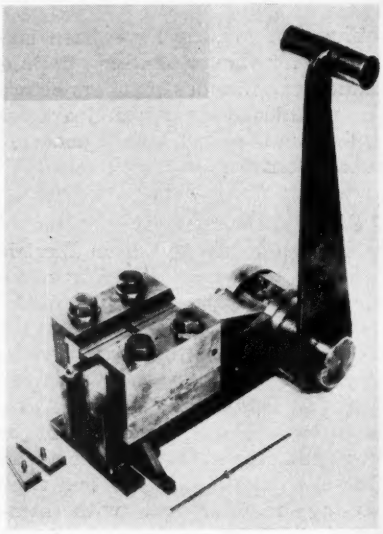


Figure 2. Tool for forming a lap weld on wires.

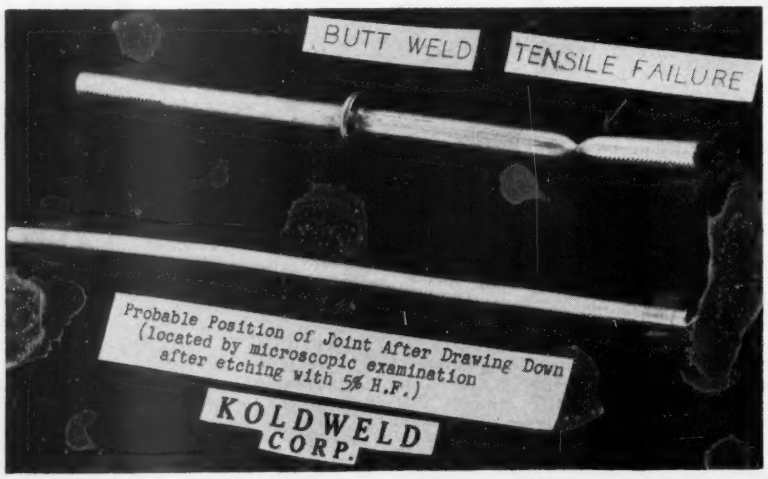


Figure 3. Illustration showing point of failure is a test and appearance of butt weld after drawing wire.

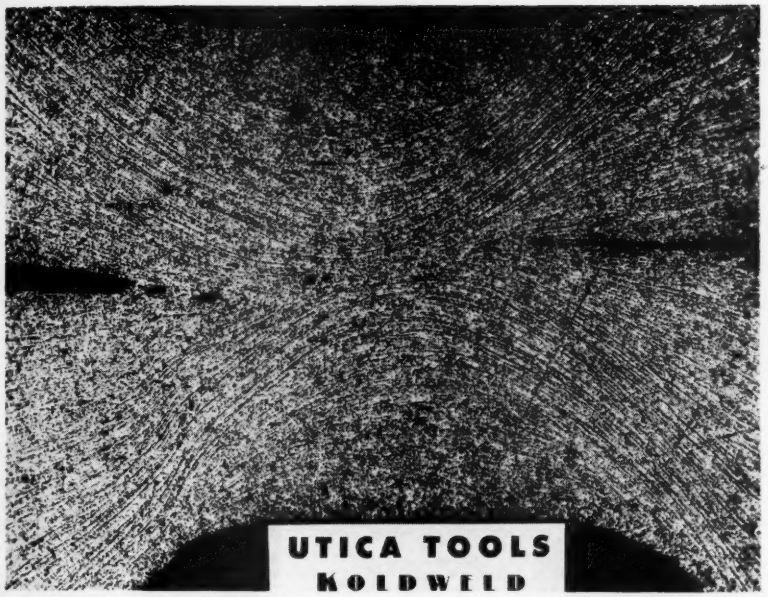


Figure 4. Microphotograph of the Koldwelded area showing the complete interflow of the metal from the two pieces forming homogeneous bond.

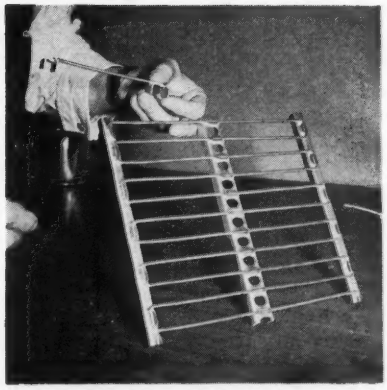
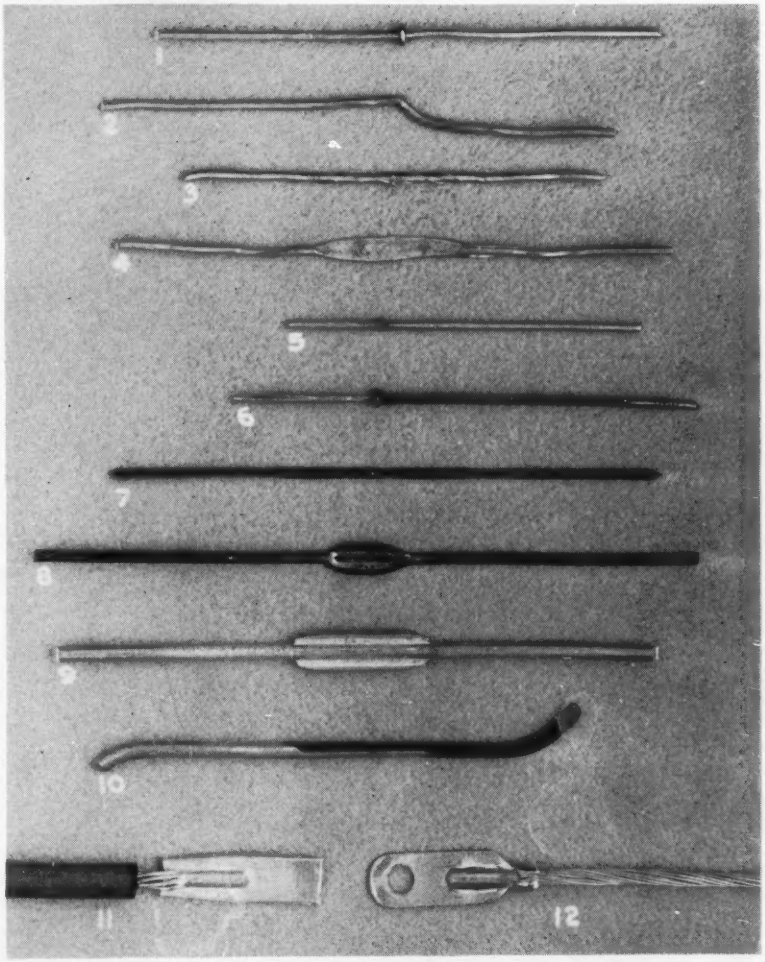


Figure 5. Example of a cold welded wire product. Figure 6 below.



1. Butt weld of aluminum to aluminum wire showing flash.
2. Butt weld of aluminum to aluminum wire with flash removed and joint bent.
3. Butt weld of aluminum to aluminum wire with flash removed partially and wire subjected to torsion tests.
4. Butt welded aluminum wire showing result of impact on weld areas.
5. Butt weld of aluminum to aluminum wire subjected to tension test. Note that the parent wire broke while weld remained intact.
6. Butt weld of aluminum to copper wire showing result of tension test. Note that the aluminum wire broke while weld remained intact.
7. Butt weld of copper to copper wire.
8. Lap weld of copper to copper wire.
9. Lap weld of aluminum to aluminum wire.
10. Lap weld of aluminum to copper wire with flash removed.
11. Insulated stranded aluminum wire welded to aluminum plate or strip.
12. Stranded aluminum wire welded to an aluminum lug termina.

molecular diffusion at discrete initial contact peaks due to extreme pressure concentration and instantaneous high temperatures thereat, cold pressure welding involves generally a cold working of the metals of both the adjoining surfaces at and near the weld area, causing the metals to pass through the sequence of breaking up the initial crystal grains into smaller blocks and subsequent recovery of reorientation and partial re-crystallization and return to the initial state. In the case of cold pressure welding, the concomitant lateral metal flow or displacement causes a substantial granular or lattice diffusion of the crystal grains of the adjoining metals, thus producing a mutual interlock and intimate solid phase bond, as evidenced by the complete disappearance of the initial interface or boundary line even under extreme magnification. At the same time, the cold working of the metal results in an increase of the strength of the joint, in contrast to the cast condition of an ordinary weld caused by heat or diffusion and based on a molecular diffusion of the metals in the molten state."

★ ★ ★

While the process has its limitations, it also has places in which its use should show distinct economic advantages. At the present time, for instance, the process can be applied with consistently successful results only to nonferrous metals whose grains flow easily under deformation stresses—such metals as aluminum and copper and many of their alloys. Some success has been achieved with cadmium, lead and nickel and combinations of them;

(*Please turn to page* 1323)

Two Tips to Top Tonnage

1 Use Carboloy Wire Dies

For maximum output in your wire-drawing operations, specify Carboloy Wire Dies.

They are made of Carboloy Cemented Carbide, the hardest metal made by man. They are designed and forged to give maximum strength, permit better lubrication, and stay on the job.

Continuous, precision production in *your* plant is assured by twenty-nine rigid quality-control tests in *our* plant, tests based on 24 years of experience as the world's largest maker of cemented tungsten carbides. That pays off for you in less downtime, more continuous production, *top tonnage!*

Note this, too: Complete stocks of standard dies, ready for immediate shipment to your plant, are maintained at Chicago, Detroit, Pittsburgh, and Los Angeles (see addresses in next column). This means you get die replacements as you need them, reducing the time your production equipment is out of action. It means lighter die inventories, too, and makes possible tighter production schedules.

2 Utilize Carboloy's Wire Die and Engineering Services

Have you a tricky die problem? Don't lose time – call in a Carboloy expert and let him trouble-shoot it for you. Carboloy engineers are always available to you through Carboloy Die Service Centers and District Offices.

Could your people know more about the application of carbides to wire drawing? Send them to school at the Carboloy Training School. The "profs" are tops and the rewards to you are ample in terms of greater efficiency and output in your plant.

Is die servicing and finishing costing you time . . . and money? Lost time means lost dollars. Get fast action by calling your nearest Carboloy Die Service Center: Chicago 7, Illinois (phone: Harrison 7-4828); Detroit 32, Michigan (phone: Jefferson 6-9100); Pittsburgh 19, Pennsylvania (phone: Court 1-4880); and Huntington Park, California (phone: Kimball 7276). Don't forget to write today for your copy of the big fully illustrated Carboloy Die Service Manual, packed with valuable tips.

Specify

CARBOLOY

CEMENTED CARBIDE WIRE, BAR, AND TUBE DRAWING DIES

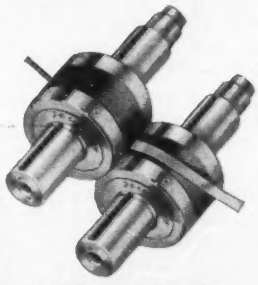
Carboloy Round-Hole Dies: Exclusive hot-forge casing process gives greater over-all strength combined with compressive backing.

Carboloy Square-Shape Dies: Checked and double-checked by rigid quality-control tests to give extra stamina, longer life.

Carboloy Hex Dies feature larger bell openings. They permit better lubrication; give better-shaped rods of any material you use.

Carboloy Capstan Rings pull wire through die; resist wear of severe tension and abrasion. They help keep production rolling.

Header Die Nibs for heading bolts, screws, etc. Standard stock items in rough-cored form in 17 different sizes. Machineable. High shock resistance.



Carboloy Wire-Flattening Rolls provide accurate sizing and finishing as round wire is rolled into a specified flat strip.

"Ca bɔloy" is the registered trademark for the products of Carboloy Department of General Electric Company

CARBOLOY

DEPARTMENT OF GENERAL ELECTRIC COMPANY

11171 E. 8 Mile Street, Detroit 32, Michigan

Plants at Detroit, Michigan; Edmore, Michigan; and Schenectady, New York

Government Wire Production Information

Brass Mill Products IAC

Members of the Brass Mill Industry Advisory Committee met in October with officials of the Office of Price Stabilization to discuss the necessity for price adjustments resulting from increased costs of materials, labor and freight in recent months.

★ ★ ★

Several members of the committee said they had not been able to obtain enough domestic copper to maintain the ratio of 60 percent domestic to 40 percent foreign copper established by the NPA under its allocations program.

★ ★ ★

As a result of having to use more than 40 percent foreign copper at 36½ cents a pound, and less than 60 percent domestic copper at 24½ cents a pound, they stated, the industry has been absorbing an increase of approximately five-eighths of a cent a pound. This was more than OPS intended when Amendment 1 to Ceiling Price Regulation 68, under which most of the industry operates, became effective June 30, 1952, committeemen said.

★ ★ ★

Estimates of the increase in labor, freight, and other operating costs by some committee members, translated to a pound basis, were about 1.72 cents a pound. Other members said the cost increases would amount to a larger sum per pound of copper.

★ ★ ★

OPS representatives explained that the only means immediately available for an industry-wide price adjustment is a survey to determine whether the industry is eligible under the OPS industry earnings standard for increased ceiling prices.

★ ★ ★

Under this standard, OPS representatives explained, an industry is eligible for a price adjustment if its current earnings, adjusted to net worth, are below 85 percent of the average earnings during the best three of the four years, 1946-1949. If the industy's earnings are below the 85 percent level, an adjustment may be made to bring earnings up to that level.

★ ★ ★

Committee members expressed the opinion that the structure of the industry is too complicated to conduct an industry earnings survey.

★ ★ ★

The opinion was general among committee members that only decontrol would solve the dual price difficulty, but the committee recommended that meanwhile a 100 percent pass-through of material, labor and freight cost increases be authorized by OPS.

★ ★ ★

OPS officials explained that such automatic pass-through authorizations are against present agency policy, but that the committee's

MODEL "J"
TYPE AUTOMATIC
MICRO-WELD BUTT WELDER

MICROMETER PRECISION — MICRO-WELD — TRADE MARK REGISTERED

This type welder is available in four Models (J-45-C) (J-5-C) (J-7-C) (J-8-C) for welding COPPER, ALUMINUM, and other nonferrous wire and rods, ranging in size from .080" to ½" diameter.

The welding cycle on these units is automatically completed by one single downward stroke of the foot pedal, which clamps the stack being welded, contacts the welding switch, and supplies the upset pressure on the weld.

All welders are equipped with annealing dies, filing vise, hand shears, and mounted on a 4-wheel truck.

MICRO PRODUCTS COMPANY
20 NORTH WACKER DRIVE, CHICAGO 6, ILL.
Telephone, State 2-7468

recommendations would be given due consideration.

New Copper Source Financed

Facilities of the Bagdad Copper Corporation at Bagdad, Arizona, will undergo major improvement and expansion during the next two years as part of the Government-industry program to increase the production of domestic copper, it has been announced by the Defense Materials Procurement Agency.

★ ★ ★

The company will spend approximately $14,000,000 on the expansion program, which will include not only enlargement of the open pit mine itself but the installation of new electrolytic refining facilities. At present, the company produces only concentrates, which are shipped to El Paso, Texas, for smelting and refining. When the expansion is completed, the mine will be one of the more important producers in the country.

★ ★ ★

With the completion of the scheduled improvements and additions, the company will have facilities with an annual productive capacity of 35,000,000 pounds of electrolytically refined copper and 12,000,000 pounds of recoverable copper contained in precipitates. The company's present annual capacity is 20,000,000 pounds of recoverable copper contained in concentrates.

★ ★ ★

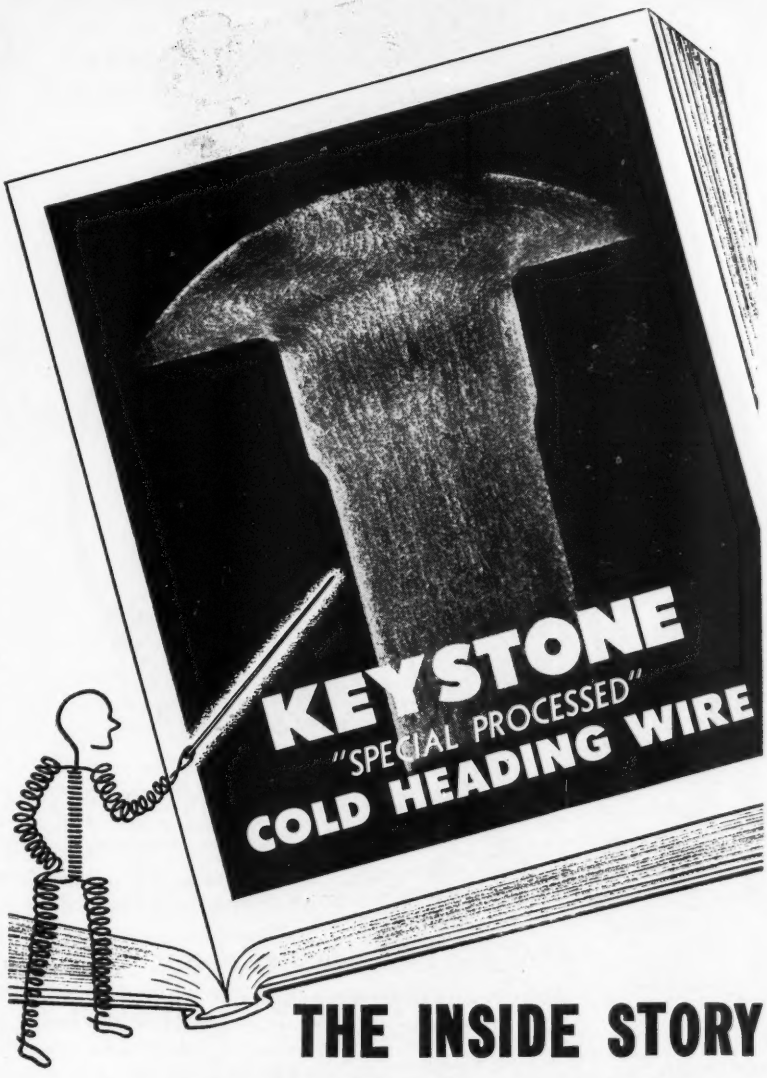
In addition to adding to the country's supply of electrolytic copper, the modernized and enlarged facilities will be capable of producing at least 940,000 pounds of molybdenite concentrates per year. The latter materials are used extensively in the production of high grade steels.

★ ★ ★

The Government has guaranteed the company a market for up to 27,000,000 pounds of copper per year at 24½ cents a pound, f.o.b. Middle Western markets, and 940,000 pounds of molybdenite at 60 cents a pound for molybdenite contained in concentrates.

★ ★ ★

The agreement covers eight years of production, terminating automatically June 30, 1962.



THE INSIDE STORY

Long continuous fibers through shank and head are the "inside" proof of efficient cold-heading.

The above macrograph shows the uniform strength-giving, grain-flow characteristics in a bolt made from Keystone C1038 Special Processed Cold Heading Wire. Such uniform grain flow assures longer die life, increased production, and a better finished product.

Whatever your industrial wire problems might be, Keystone metallurgical research and testing facilities are available to supply the answers.

INDUSTRIAL WIRE SPECIALISTS

Keystone Steel & Wire Company
PEORIA 7, ILLINOIS

NEW AO ELDER

DIE-ANGLE SCOPE

Developed and manufactured under license with Mr. Flint C. Elder, former Director of Research at American Steel and Wire Company.

Checks Carbide Die Entrance Angle

. . . INSURES WIRE QUALITY

Now die entrance angles can be carefully checked in less than one minute with the new DIE-ANGLE SCOPE. Even unskilled operators with only a few minutes' instruction can make measurements to an accuracy of ± 10 minutes of arc. The die is *not* damaged in any way. Multiple angles and poor polish are obvious immediately. Every size of die—down to the smallest at .005"—can be measured accurately.

THINK WHAT THIS DEVELOPMENT MEANS to you in more efficient control of wire drawing processes—in higher quality, reduced spoilage, *greater profits*. Here for the *first* time is a practical shop instrument for checking carbide die entrance angles *before* they can affect wire quality.

The AO Elder Die Angle Instrument is compact, portable simple to operate, and, like all AO Scientific Instruments, *dependably accurate*. It is sturdily constructed of lightweight aluminum castings, with integral light source and transformer. Supplied in leatherette carrying case. Write *today* for free literature.

PRICE COMPLETE $650.00

American Optical COMPANY

INSTRUMENT DIVISION • BUFFALO 15, NEW YORK

Tack Manufacturers IAC

Members of the Tack Manufacturers Industry Advisory Committee met recently with officials of the Office of Price Stabilization to discuss industry pricing problems.

★ ★ ★

The industry produces a wide range of cut and wire tacks. Some companies also produce cut and wire nails and related items. It was pointed out that, over the past years, the manufacture of tacks has been a declining industry, due principally to the steadily increasing use of other types of fasteners as a substitute for tacks. At present, there are only about 10 or 12 firms manufacturing tacks.

★ ★ ★

Committeemen said the industry is in a serious price squeeze because of increased labor and materials costs.

★ ★ ★

Members contended that cut tacks should be classified the same as wire tacks and be given a price increase similar to the increase provided for wire tacks, as a result of the steel wage-price settlement, by Supplementary Regulation 100, Revision 1, under the General Ceiling Price Regulation (GCPR). They pointed out that SR 100 provides a price increase of $22 a ton for wire tacks and $9 a ton for cut and wire nails. They said that cut and wire tacks are produced on the same machines and with the same type of labor used in the production of cut and wire nails and, therefore, cut tacks should be included in SR 100 as a steel mill product with an appropriate price increase.

★ ★ ★

OPS officials said the question of classifying cut tacks as a steel mill product would be given consideration. They also pointed out that the industry could apply for price relief under the agency's industry earnings standard which provides for ceiling price adjustments if an industry can show that its current earnings have dropped below 85 percent of its average earnings in the best three of the four years 1946-49, adjusted to reflect changes in net worth.

★ ★ ★

There was some difference of opinion among members as to whether the industry could qualify

for an industry earnings standard adjustment because most tack manufacturers produce a multipilicity of other items.

DMP Head Concerned About Lead and Zinc Production

Jess Larson, Administrator of the Defense Materials Procurement Agency, said recently that he was "gravely concerned" about the number of lead and zinc mines that have been forced to shut down in recent weeks because of the declines in prices being offered for the two strategic metals.

★ ★ ★

Mr. Larson said that a considerable number of marginal mines had already shut down and, in view of present high operating costs, additional cut-backs in production are inevitable unless there is a substantial increase in prices of lead and zinc in the very near future. He further declared:

"**The** freeing of the London lead market and reports that the British Government contemplates removing its controls over the zinc market about the first of the year have had the effect of creating an artificial surplus of the two metals.

★ ★ ★

Actually, there is no surplus of production. On the contrary, unless production of both lead and zinc can be maintained at the level that prevailed prior to the recent price declines, serious shortages are almost certain to develop next year.

★ ★ ★

The Government's lead program calls for an expansion of only 2 per cent by 1955 and the zinc program for an expansion of only 15 per cent by 1955. These goals were based on the firmest possible estimates of future requirements of the defense program and our domestic needs. Obviously we will be confronted with serious shortages if the production contemplated in these programs is substantially reduced for any considerable period of time.

★ ★ ★

I have received many inquiries as to what plans the Government has for dealing with this situation. There is great concern throughout the domestic industry, and I share that concern.

★ ★ ★

Cover non-metallic sheathed cable, building wire and weatherproof wire

1800 feet an hour

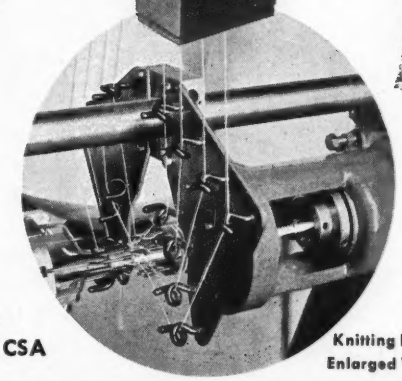
with

***Fidelity* SINFRA**

KNITTERS

Model C-3H Knitter & Haul-Off Reel Stand

★ **Increase speed 10-15 times**
★ **Save on cost of yarn**
★ **Boost labor output 600%**
★ **Eliminate yarn rewinding**
★ **Conserve floor space**
★ **Cut maintenance costs**
★ **Reduce power requirements**
★ **Minimize operating noise**
★ **Improve working conditions**
★ **Provides automatic control**
★ **Lower your capital investment**
★ **Approved by UL, ASA, AAR, CSA**



Knitting Head Enlarged View

This *Fidelity Sinfra* Wire Covering Machine offers you high production speed and low operating cost. The output of *one* Knitter equals 15 conventional machines. Savings in yarn costs and direct labor alone pay for this new equipment in 12 to 24 months. Knit products are universally used and meet all standards.

The modern Fidelity Sinfra method uses fewer yarns and large 3 pound cones located on a stationary creel. High-speed, rotating Knitting Heads cover the wire at 30 or more feet per minute. Design permits horizontal operation at convenient working level with no crawling or stretching. Automatic electric stop motions and other advanced features cut maintenance and down time.

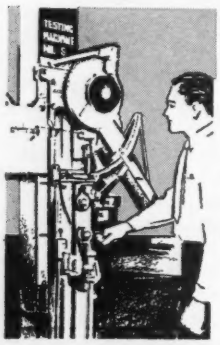
To see why top companies choose Fidelity, read our literature proving its advantages. Write today for Catalog W.

Manufacturers of intricate precision machinery since 1911

FIDELITY MACHINE COMPANY INC.

3908 FRANKFORD AVE. • PHILADELPHIA 24, PA.

UNLIMITED!



Johnson XLO Music Wire, "the wire of a thousand uses" —high-grade springs and wire forms difficult of formation. Johnson makes this wire better in order that your products may be better. Where service required is exacting, you can depend on Johnson XLO Music Wire.

"Johnson Sets the Standard of the Industry"

JOHNSON

JOHNSON STEEL and WIRE CO., INC.

Worcester 1, Massachusetts

SUBSIDIARY OF PITTSBURGH STEEL COMPANY

On the basis of all available evidence, the present price situation is of a temporary nature. I am sure that actual demand will catch up with the artificial surplus in the near future.

★ ★ ★

At the same time, the Defense Materials Procurement Agency is giving the closest study to the situation. We are exploring every avenue for a possible solution. It is my hope that the situation will right itself in the near future. If it does not, every possible remedial measure will be taken to assure production of needed supplies of lead and zinc for the defense program and necessary civilian use."

Producers of Brass Mill and Copper Wire Mill Products

The Office of Price Stabilization has announced that producers of brass mill and copper wire mill products will not be required to recalculate ceiling price adjustments covering cost of foreign copper before January 1, 1953.

★ ★ ★

On July 1, 1952, these producers were permitted to adjust their ceiling prices to reflect increased cost of foreign copper. This action was taken under Amendment 1 to Ceiling Price Regulation 68 covering brass mill products, and under Amendment 1 to Ceiling Price Regulation 110 covering copper wire mill products.

★ ★ ★

When these price adjustments were authorized, it was contemplated that the adjustments would be effective for a limited period of time, and that a recalculation of the adjustments would be required at a later date.

★ ★ ★

It appears that producers are presently purchasing foreign copper for December delivery at a prevailing price of 36½ cents a pound, which is the same price used in determining the current ceiling price adjustments. Therefore, it is not contemplated that any recalculation of the adjustments will be required before January 1, 1953.

Engineer Examinations for Bureau of Reclamation Announced

The U. S. Civil Service Commission has announced examinations

for Engineer and Engineer Trainee positions in the Bureau of Reclamation in the West and Midwest. Salaries for Engineers are $3,410 and $4,205 a year, and for Engineer Trainee, $2,950 and $3,175 a year.

★ ★ ★

The Engineer Trainee examination is open to persons who have completed or will complete by June 30, 1953, one-half or three-fourths of a professional college engineering course. Applicants for these jobs will be given a written test. Applicants for the Engineer examination will be rated on the basis of their education and experience only. Maximum age limit for the Trainee jobs and Engineer jobs paying $3,410 is 35; for others, 62.

★ ★ ★

Further information and application forms may be obtained at most first and second-class post offices or from the U. S. Civil Service Commission, Washington 25, D. C. Applications for Engineer Trainee will be accepted until December 2, 1952, and for Engineer until further notice, by the Executive Secretary, Board of U. S. Civil Service Examiners, Bureau of Reclamation, Denver Federal Center, Denver, Colorado.

Booklet Offered on Complete Line of Washers

An eight-page, three-color booklet which describes in detail their complete line of industrial washers is offered by the **Detrex Corporation,** Box 501, Detroit 32, Michigan.

★ ★ ★

The booklet is profusely illustrated with actual photographs of equipment ranging from single-stage, totally enclosed cabinet washers to huge, five-stage phosphate coating and paint bonding machines.

★ ★ ★

The operational advantages of "one-source efficiency" are described in the Detrex washer booklet. Also included are some general washer operating hints that will be of valuable assistance to plants using alkali or emulsion washers in their production cleaning line.

★ ★ ★

THESE 4 *Solar* COMPOUNDS ARE "Conditioned" for conditions!

BECAUSE both the angle of the glass braid, particularly on building wire and armored cable conductors, and the temperature conditions encountered during shipping, warehouse storage and installation have a direct bearing on the particular types of saturants and finishers used, it is important to your company that you are aware of the qualifications of various compounds.

Solarite KS-566 Saturating and KF-561 Finishing Compounds—used over all glass braided, rubber covered wire and non-metallic sheathed cable—are specifically designed to meet stringent conditions. They provide excellent moisture resistance, retain flexibility at low temperatures and prevent sticking in coils at extremely high temperatures.

For more normal conditions where extremities are not likely to be encountered, it is more practical and less expensive to apply Solarite KS-709 Saturating and KF-715 Finishing Compounds. These materials have excellent tank stability, operating characteristics and flame retardant qualities.

SPECIFICATIONS

Solarite KS-566 Saturating Compound		Solarite KS-709 Saturating Compound	
Softening Pt.—(B & R)	140°F. Min.	Softening Pt.—(B & R)	120°F. Min.
Penetration @ 77°F., 100 gr., 5 Sec.	60-75	Penetration @ 77°F., 100 gr., 5 Sec.	44-55
Stormer Viscosity @ 300°F. 100 Revolutions	85-110 Sec.	Viscosity, Stormer @ 300°F., 100 Revolutions	28-34 Sec.
Specific Gravity @ 25°C.	1.00-1.04	Specific Gravity @ 25°C.	1.02-1.06
Flash Pt.	500°F. Min.	Flash Pt.	530°F. Min.
Fire Pt.	600°F. Min.	Fire Pt.	600°F. Min.
Solarite KF-561 Finishing Compound		**Solarite KF-715 Finishing Compound**	
Softening Pt.—(B & R)	220°F. Min.	Softening Pt. (B & R)	200°F. Min.
Penetration @ 77°F., 100 gr., 5 Sec.	14-16	Penetration @ 77°F., 100 gr., 5 sec.	7-10
Viscosity, Stormer—360°F.	3-10 RPM	Viscosity, Stormer—36°F.	5-12 R.P.M.
Specific Gravity @ 77°/77°F.	1.02-1.06	Specific Gravity— 77°F/77°F.	1.02-1.06
Flash Pt.	Over 500°F.	Flash Pt.	500°F.

Note: Regardless of what combination is used, it is important that paint be used as an anti-stick.

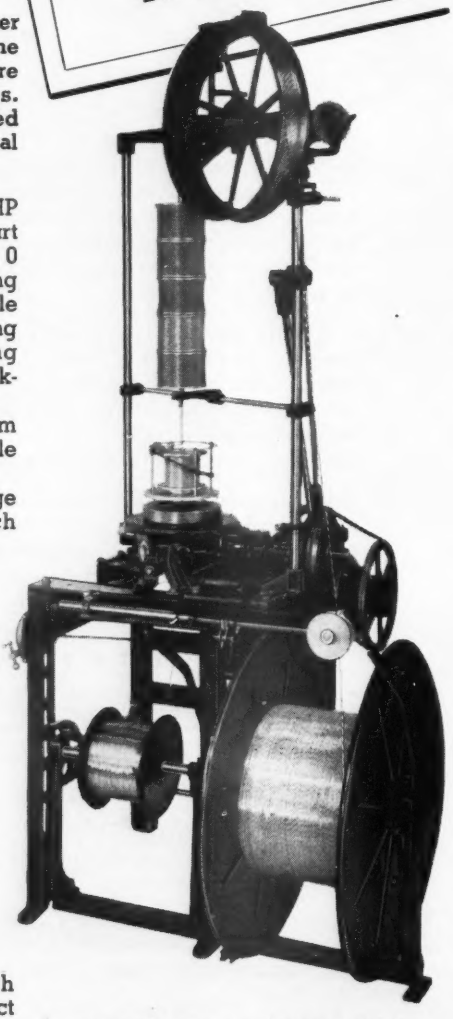
The services of our technical staff are available to you without obligation.
For additional information, write Solar Compounds Corporation.

Solar Compounds Corporation
Solar Varnish Corporation
1213 WEST BLANCKE ST. · LINDEN N. J.

A NEW VERSATILE SERVER

WARDWELLIAN P-C SERVING MACHINE

For applying small diameter filaments such as polyethylene and materials of a similar nature on electrical conductors. Machine is especially adapted for the production of coaxial wires.



- Machine driven by a ½ HP Graham Transmission to start at head speeds ranging from 0 to 2000 RPM. Permits starting operation at any speed suitable for type of material being served, thereby eliminating stretching and avoiding breaking material.
- Manual control for Graham Transmission readily accessible at front of machine.
- Standard set of five change gears furnished with each machine.
- Machine equipped with electric stop-motion.
- Production dependent upon requirements: 4912 feet per hour for applying material at ½" lay.
- Supply tube holds five spools.
- Supply spools made in halves to permit removal without cutting wire.
- Seven supply spools furnished with machine.
- Capstan 18" diameter, 3" face.
- Opening through serving head, 3/16" diameter.
- Machine equipped with counter for measuring product in feet.
- Stand will accommodate reel 30" in diameter with 13" overall width.
- Special windup parts required for reels with drums under 8" in diameter.
- Reels not included with machine.
- Weight approximately 664 lbs.
- Weight crated for domestic shipment approximately 764 lbs.

WARDWELL
BRAIDING MACHINE CO.
Central Falls
Rhode Island, U. S. A.
Representatives for Europe, British Colonies and Dependencies
JAMES MACKIE & SONS, LTD., BELFAST, IRELAND

Wire Association Clock Wound for Another Year

The handsome clock presented to The Wire Association by its British members in 1948 was wound for another year of precision timekeeping on November 7th by **Mr. P. Thirkell Cox,** Director of the British Steel Wire Industries Association of Manchester, England.

★ ★ ★

Since the presentation of the clock at Pittsburgh, Pennsylvania, by John Rigby at the annual Convention of The Wire Association, the clock has traditionally been wound by a British member of our society or by someone designated by such a member.

Mr. Cox and Mr. Seymour

Mr. Cox responded graciously to the invitation extended to him earlier this year to perform the ceremony. He was brought to our offices by **Leroy D. Seymour** of the Marshall Richards Machine Company, Inc., who is acting as host to Mr. Cox while in the United States.

★ ★ ★

Following the ceremony, Mr. Cox and Mr. Seymour departed for Cleveland to attend the convention. As Mr. Cox' visit to this country was primarily to wind the clock, we are most grateful to him for his courtesy in arranging to call at our headquarters. Our very sincere appreciation of his kindness is hereby expressed in behalf of the members of The Wire Association.

Outstanding Personalities of the Wire Industry

Tom Girdler Moved to Massillon

Appointment of **Tom M. Girdler, Jr.** to the newly-created position of assistant manager of operations for the **Union Drawn Steel Division of Republic Steel Corporation** has been announced by D. D. Buchanan, manager of operations. The appointment became effective as of November 1st.

★ ★ ★

Prior to this appointment Mr. Girdler was superintendent of Union Drawn's Beaver Falls, Pennsylvania plant. He has been moved to the Division's headquarters at Massillon, Ohio.

★ ★ ★

Mr. Girdler is succeeded at Beaver Falls by **Horace B. Anderson,** who has been assistant superintendent of Union Drawn's Massillon plant.

Tom M. Girdler, Jr. * *

★ ★ ★

Harry B. Matzen, Jr., an industrial engineer at Massillon, has succeeded Mr. Anderson as assistant superintendent at the Massillon plant.

★ ★ ★

Mr. Buchanan said that constantly increasing activity at Union Drawn's five plants throughout the United States made creation of the new position of assistant manager of operations necessary.

★ ★ ★

Republic's Union Drawn Steel Division is one of the country's largest producers of cold drawn steels. While the Division supplies

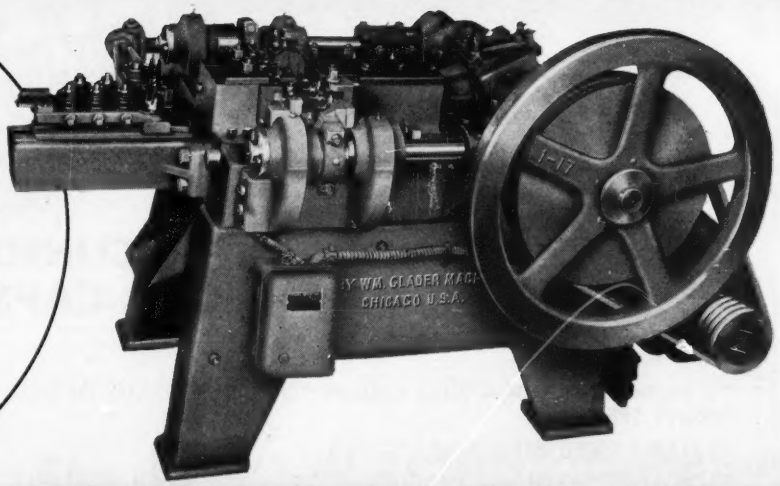
GLADER

HIGH SPEED WIRE NAIL MACHINES

HIGH TONNAGE OUTPUT—LOW MAINTENANCE COST

You can take care of increased production schedules and better product demands with these machines of established reputation.

For 55 years GLADER MACHINES have been giving HIGH QUALITY, LOW COST nail production.



Wm. Glader Machine Works 210 N. Racine Avenue Chicago 7, Illinois

Export Dept.: 122 E. 42nd STREET, NEW YORK 17, N. Y.

a wide variety of carbon, alloy and stainless steel bars to diversified manufacturing companies, it is a particularly large supplier to automotive and farm equipment manufacturers and the aircraft, ordnance and other defense industries.

★ ★ ★

The Division is comprised of plants at Massillon, Beaver Falls, Gary, East Hartford, Conn. and Los Angeles. A subsidiary company, Union Drawn Steel Company, Ltd., is located at Hamilton, Ontario, Canada.

★ ★ ★

Tom Girdler joined Republic in 1945, following service in World War II as an Army Ordnance captain. He has been superintendent of the Beaver Falls plant since 1949. He is a graduate of the University of Michigan and is a director of The Wire Association and has just been elected Vice President, Ferrous Division, of the society.

Appointed to Council of the Institute of Metallurgists

Reginald S. Brown, Chief Metallurgist of **Rylands Brothers, Ltd.,** Warrington, England, was recently appointed to the Council of the Institute of Metallurgists and is to represent this body on the Council of the Iron and Steel Institute in England.

★ ★ ★

Mr. Brown is a member of The Wire Association and is well known to those who attend our Conventions through his excellent papers and participation in discussions following papers delivered by others.

Batchelor Becomes President of Riverside Metal

Mead W. Batchelor has been elected president of the **Riverside Metal Company,** Riverside, N. J., replacing **James T. Duffy, Jr.,** who has joined the **Camden Forge Company** as its executive vice-president.

Promoted by Columbia-Geneva Steel

H. C. Cranfill was recently promoted to assistant to the vice president-operations, **Columbia-Geneva Steel Division, U. S. Steel Co.,** San Francisco. He succeeds **R. B. Freeman,** transferred to the foundry at Pittsburg, Calif., as project manager for the rehabilitation and operation of the plant under a U. S. government contract.

Made Chief Draftsman by Hooker

L. J. Call, Jr. has been appointed chief draftsman of **Hooker Electrochemical Company** according to D. E. Springer, chief engineer of the company. A graduate of University of Michigan in 1938, Mr. Call was employed as a draftsman in the engineering department in November 1940. In April 1942 he was made designing engineer and in August 1951 was made assistant chief draftsman. He succeeds W. J. Mitchell, recently retired, as chief draftsman.

Walter M. Floto

Services for **Walter M. Floto,** veteran sales executive of U. S. Steel's American Steel & Wire Division, were held in Chicago on November 5th. Interment was in the Forest Home Cemetery, Forest Park, Ill.

(Please turn to page 1333

24 UNIT INCLINED TAKE-UP AND GROUP CAPSTAN UNIT

TO PERMIT EACH OF 4 WIRE GROUPS TO RUN THE SAME OR DIFFERENT SPEEDS.

VARIABLE SPEED DRIVE TO CAPSTANS.

EACH UNIT WITH AN INDIVIDUAL TRAVERSE, EACH VARIABLE FOR WIDTH AND RATE OF TRAVERSE PER TURN OF SPOOL.

INDIVIDUAL TORQUE MOTOR DRIVE TO EACH SPOOL SPINDLE. WORM GEARS RUN IN OIL, ALEMITE LUBRICATION TO OTHER POINTS.

EST. 1855 AIMCO INC. 1915

"American" AIM INSULATING MACHINERY COMPANY

REG. U.S. PAT. OFF.

FAIRHILL AND HUNTINGDON STREETS

PHILADELPHIA 33 PENNSYLVANIA U.S.A.

Organized Cost Reduction

(*Continued from page* 1286)

changes in the process itself which require careful checking from the cost point of view.

★ ★ ★

The Industrial Engineering and the Accounting Departments are prepared to provide a cost comparison between present and proposed costs.

★ ★ ★

Safety—New methods should be safer because usually they involve less handling, easier work by men, less walking, and more mechanical aids, and because of the opportunity to thoroughly review the method in our systematic approach. However, every step of the new method should be checked to insure safe performance by the operator. "Exactly how will the operator perform this step?" is the question.

★ ★ ★

The safety supervisor will check new equipment and practices where any doubt exists. This is particularly true where new materials or chemicals are involved.

★ ★ ★

Quality—It is quite possible that in some instances methods improvements might be a disadvantage quality-wise. The effect on quality should always be checked. At the same time, an improvement is possible in the area of quality if the quality standards have been too high. Here too, the Metallurgists and Production Planning can help, particularly when there is a question of what is acceptable to the customer.

★ ★ ★

Related Operations—A new method of operation may affect either the before or after operation or both. Generally the only effect on the preceding operations results from changes in handling practices which might affect their handling practice. Naturally, when this happens, we should balance the advantages and disadvantages on an over-all plant basis to determine whether or not to proceed with the new method. In the case of the following operations, it is also possible that a method improvement may affect handling practices in the next operations. However, here another factor must also be recognized, namely, that the condition of the product at the time of delivery to the next operation also may affect the succeeding operations. Here again we must check to determine the possible effects of our methods improvement and balance the advantages and disadvantages on a total plant basis.

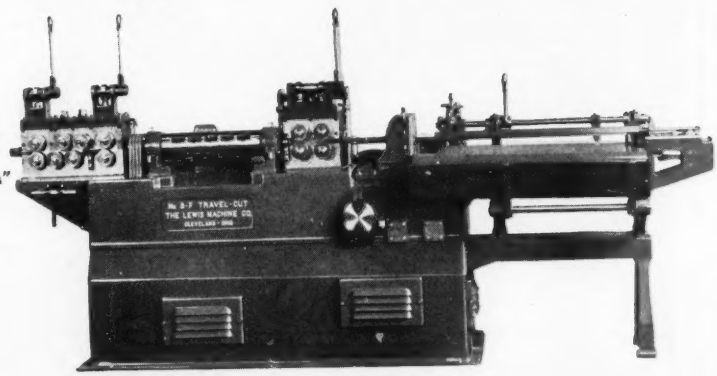
★ ★ ★

Incentive—We must be aware of the section of the Labor Agreement dealing with incentives and bear in mind that any proposed methods change for an operation may involve this portion of the Labor Agreement. As in the case of classification above, the best procedure is to request the advice of the Industrial Engineering Department where any doubt exists as to possible effect on an incentive application due to a methods change. It should also be realized that if the methods improvement alters production and you do not correct the incentive, earnings under the incentive application will very likely be-

Fast, Accurate, Economical

STRAIGHTENING and CUTTING

with LEWIS TRAVEL-CUT



22 Models to handle from 1/16" to ¾" Round, Hex, Flat, Shapes.

Simple in design, rigid in construction, Lewis TRAVEL CUT will deliver continuous dependable service under the most severe, high production conditions—day in, day out. Feeds wire from the coil, straightens accurately, gauges to uniform length, and cuts clean without stopping the wire. For steel, brass, aluminum and alloy wire. Cut your cutting costs with the Lewis TRAVEL CUT. Full details on request.

Exclusive Representatives

EAST: Penn Machinery Co., 117 North Third Street, Philadelphia 6, Penn.

MIDDLE WEST: Steel & Wire Machinery Co., 15457 Euclid Ave., Cleveland 12, O.

CENTRAL: Moslo Machinery Co., 2443 Prospect Avenue, Cleveland 15, Ohio.

WEST COAST: Hoffman & Heartt, 3005 So. Grand Ave., Los Angeles 7, California

CANADIAN: Empire Engineering Co., 11 Wellington St. E., Toronto 1, Ontario.

CONTINENTAL EUROPE: Gaston E. Marbaix Ltd., Devonshire House Vicarage Crescent, London S. W. 11, England.

The LEWIS MACHINE Company

3441 E. 76th Street, Cleveland 27, Ohio

Also agents in Paris, Stockholm, Rotterdam, Brussels, Zurich. Milan, Bombay and Melbourne

come inequitable. Then, not only will savings be distorted, but an unhealthy rate situation will prevail, leading to other labor relations problems, such as wage inequities and a distortion of the normal promotional sequences.

★ ★ ★

Check Impact on Classification—Undoubtedly, you can all see where a methods change of a job could very easily affect the job content. It is necessary, therefore, that care be exercised to review the effect of any proposed methods change on the existing job description and classification. The best way to meet this situation, is, first, to be aware at all times of this contract provision and, second, request Industrial Engineering to help investigate to see whether or not the content of the job has been changed by more than one full job class.

★ ★ ★

Personnel Moves—Some methods improvements will affect crew sizes and also the number of crews necessary to meet required production levels. Wherever either of these situations result, it will be necessary to make readjustments in the working force. Care should be exercised that all such moves are consistent with the provisions of the Labor Agreement, particularly in regards to seniority. Any possible problem in this area should be called to the attention of the Industrial Relations people as well.

★ ★ ★

Training the Operator—In the final analysis, the new method will not work unless the operator performs as he is supposed to be performing. The whole advantage may be lost through failure to give adequate attention to the instructions required for proper performance of the operation. The breakdown of the new method is a good start in drawing up the necessary job instructions for the operation.

★ ★ ★

The main steps in the operation are already laid out. There remains only for the foreman to figure out any key points involved in the performance of each step. Key points are anything that make or break the job. For example, safety precautions, tolerances, critical body movements such as the way the operator should use his hands, place his feet, etc.

★ ★ ★

Labor Agreement Provisions—Many other provisions of the Labor Agreement may be involved in methods improvements. For this reason, it is always good practice to review all proposed methods improvements with the Industrial Relations people. Such portions of the Labor Agreement as local working conditions; safety and health, and others, may be involved as well as those mentioned. By checking carefully prior to installing the proposed new method, possible difficulties may be determined in advance and plans made to avoid adverse labor conditions.

★ ★ ★

We must always recognize these problems:

Human—Anticipate Resistance to Change

People are prone to resist new ways of doing things—some because they take it as criticism of their old ways; others because they are suspicious of anything they don't understand.

★ ★ ★

Get Staff Help:

1. **Industrial Relations—to pave the way with the men involved. Remember people must be treated as individuals.**
2. **Industrial Engineering—To help provide the facts for management.**

WIRE SPOOLS, ALL-STEEL, LITHOGRAPHED

Ends and traverses may be shipped separately and assembled easily in your plant on a hand, foot, or power press.

5" and 6½" diameter ends with 1-15/16" diameter traverses.
10½" diameter ends with 3½" diameter traverses.
Traverse lengths up to 12".

J. L. CLARK MANUFACTURING CO.
600 23rd AVENUE • ROCKFORD, ILLINOIS

3. **Don't forget improvements can change a job so much that operators will require re-training. The Training Supervisor can help here.**

★ ★ ★

Technical—Ask for Staff Assistance

When someone in your family is sick, you call a doctor. If you have a legal problem, you would take it to a lawyer. There are garages to repair cars, shops to repair television sets, and so on. All of these are special services calling for experts in their line. We accept this fact and are willing to pay for this service, though we may put it off as long as possible because it costs us money out-of-pocket.

★ ★ ★

In our mill problems the Staff Departments send out no bills. Their services are there to be used to save time, to help in their special fields. One of the biggest problems in this day and age is the over-abundance of information; our trade publications are flooded with word of new developments. Staff Departments receive all this paper and cull out the ideas that are useful.

★ ★ ★

In closing this discussion on Organized Cost Reduction, let's refer to an interesting survey conducted by Iron Age Magazine. The title of the survey is "Management: What's wrong in your plant?" The results were tabulated in the May 29, 1952 issue of Iron Age.

★ ★ ★

These questions led to the survey. "What's on Management's mind? What keeps metalworking executives awake at night? Where does American Management find its greatest challenge?"

★ ★ ★

Iron Age surveyed metalworking firms across the country asking top executives which of ten broad areas of management concerned them most. Replies were received from 201 key management men and their three most important problems rank in the following order of importance.

1. **Cost control.**
2. **Employee relations.**
3. **Quality control.**

This further substantiates the need for being systematic about cost reduction.

★ ★ ★

It all reverts to these five basic fundamental steps.

1. **Determine the area (LOOK)**
2. **Get the facts (SEE)**
3. **Analyze the facts (THINK)**
4. **Develop a better method (DECIDE)**
5. **Install the better method (ACT)**

★ ★ ★

As is demonstrated by the case studies we've discussed this philosophy is applicable to any problem whether simple or complex.

Silver Wire — Its Cold Working and Annealing

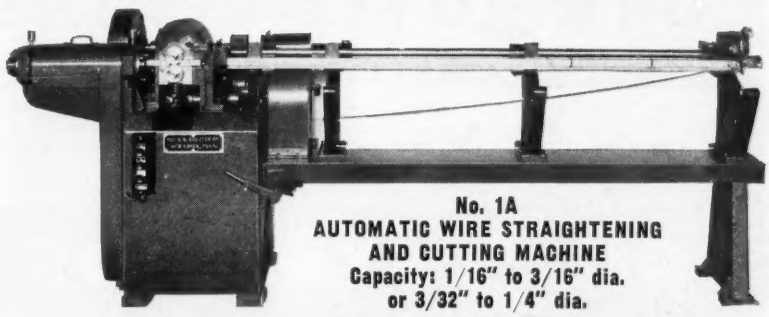
(*Continued from page* 1296)

have been plotted on the same diagram vs. the inverse of the absolute temperature of annealing. The points for each percentage of reduction arranged themselves into straight lines.

★ ★ ★

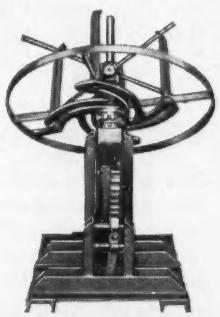
The slopes of these lines resulted in average values of the activation energies and frequency coefficients of each degree of cold work. A plot of these coefficients vs. the corresponding percentage of reduction is given in Figure 7. The values for 21 pct reduction have been obtained by interpolation. It may be seen in Figure 7 that the activation energy remains constant up to 65 pct of cold work and diminishes steadily for higher percentages of reduction. The constant level of activation energy is approximately at 30,000 cal per mol, a value found previously for copper, nickel, and iron.

A "SHUSTER" *automatically* boosts production in wire-using plants!



No. 1A
AUTOMATIC WIRE STRAIGHTENING AND CUTTING MACHINE
Capacity: 1/16" to 3/16" dia. or 3/32" to 1/4" dia.

Wherever a Shuster is installed, production increases as high as 75 percent have been recorded. Shusters take wire from coil stock, then straighten and cut it to accurate lengths, all in a smooth, precision operation noted for the almost continuous wire travel. Once set, Shusters require little attention beyond keeping them supplied with coils. Sizes available for .025" to 11/16" dia. wire; shapes, flat stock, tubing. Write us your requirements.

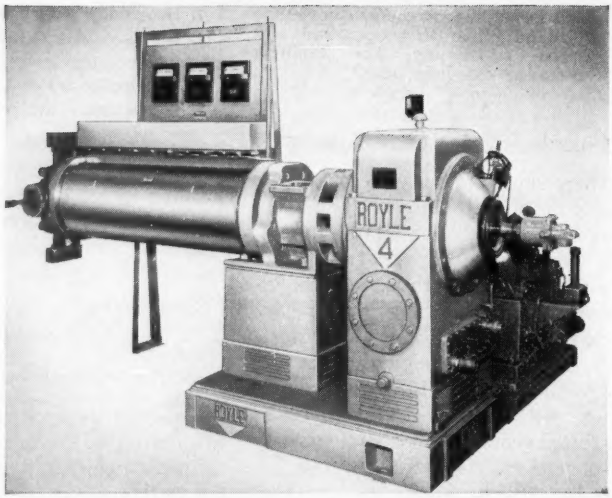


SHUSTER WIRE REELS
The counterbalancing weight does practically all the lifting, permitting one man to raise the heaviest coils of wire to the operating position.

Mfd. by **METTLER MACHINE TOOL, INC.**
132 W. Lawrence St., New Haven, Conn.
Representatives in all principal cities and in foreign countries.

SHUSTER *Automatic* Since 1866 WIRE STRAIGHTENING AND CUTTING MACHINES

ROYLE
SPIROD* EXTRUDERS



Built by America's oldest builders of extruding machines Royle Spirod extruders are the result of more than seventy years experience in the design of extruding machines. Time tested and proven features are built into Royle Spirod extruders to assure maximum productivity at minimum operating cost. These features include: Heavy steel members without flanges . . . Spirally installed rod type heating elements to provide faster, steadier, more evenly distributed heat . . . Complete insulation of cylinder and head to reduce heat loss with substantial power savings . . . Separate heating zones controlled by proportioning instruments.

CHECK THESE FEATURES that assure profitable and trouble-free production of such items as plastic insulated wire, flexible and rigid pipe, plastic sheeting, plastic clothes line, to mention a few of the products that are produced daily with Royle Spirod extruders.

*Patent Applied for

JOHN ROYLE & SONS

ROYLE PATERSON N. J. 1880

PIONEERED THE CONTINUOUS EXTRUSION PROCESS IN

London, England
James Day (Machinery) Ltd.
REgent 2430

Home Office
V. M. Hovey J. W. VanRiper
SHerwood 2-8262

Akron, Ohio
J. C. Clinefelter
JEfferson 3264

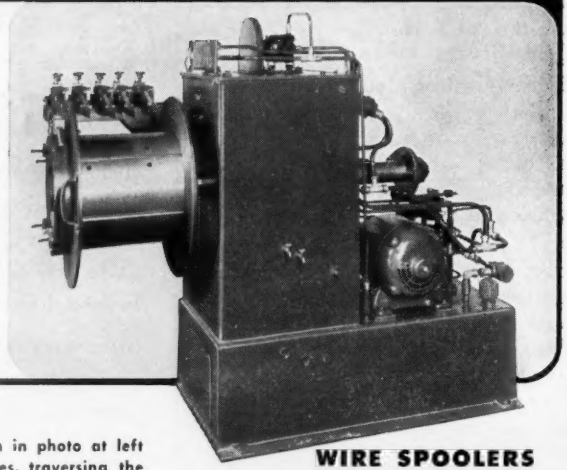
Los Angeles, Cal.
H. M. Royal, Inc.
LOgan 3261

PATERSON 3, NEW JERSEY

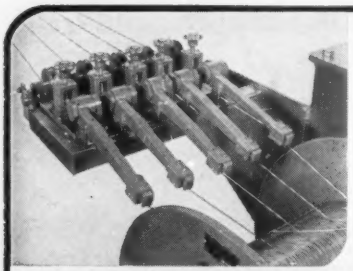
COIL 5 STRANDS IN 1 OPERATION

SECO TRAVERSE REEL SPEEDS UP PRODUCTION

This new SECO Traverse Reel winds five separate coils of flat wire or narrow strip *at the same time.* Coils are oscillated-wound, permitting much longer lengths than conventional ribbon-wound coils. Smooth, powerful hydraulic operation gives coiling speeds as high as desired, accurately controlled from zero to top running speed.



WIRE SPOOLERS
Single and Multiple type. Speeds up to 4,000 feet per minute.



Method of coiling is shown in photo at left The complete block oscillates, traversing the wire into five 3" wide coils. Traverse and tension control are extremely accurate. 1/8" to 1/2" wide flat wire can be wound. Block has 16" inside diameter and 24" outside diameter.

Call or Write for Information and Complete Data — No Obligation

STEEL EQUIPMENT CO.

P. O. Box 737, Warrensville Station, Cleveland 22, Ohio

SECO

The values of the frequency coefficient, c, are also plotted on Figure 7. They arrange themselves into a curve which slowly increases up to about 60 pct reduction and subsequently decreases.

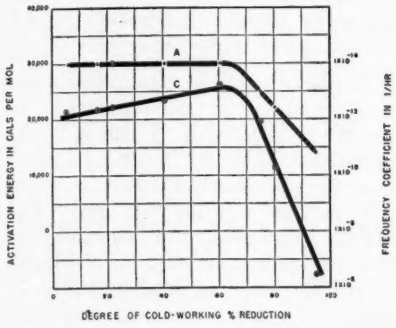


Figure 7. Change of Activation Energy A and the Frequency Coefficient C of Primary Recrystallization of Silver due to Degree of Cold-Working.

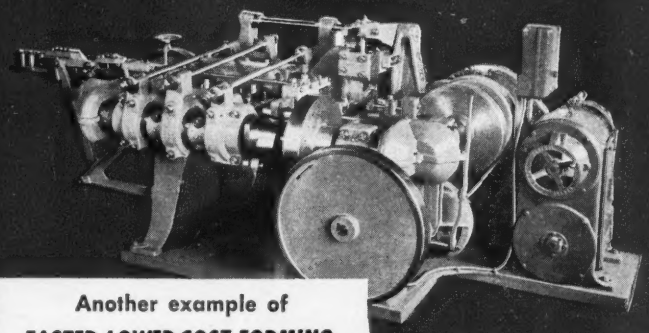
Verification of the Treatment Employed

There are two pertinent questions which demand an answer: 1—how accurately do the equations used in the treatment describe the course of reannealing, and 2—how well are the activation energy and the frequency coefficients determined? A positive answer to both questions can be secured by confronting the experimentally found values of three properties studied after 15 min annealing at different temperatures with corresponding values derived by calculation from the equations used. A reasonably good coincidence of calculated and experimental points should constitute a proof that both the equations employed, as well as the constants used, are sound. Too great a difference between the experimental and calculated values would indicate that either the equation or the constants are wrong. An additional investigation would then be necessary to secure an individual answer to the two questions.

★ ★ ★

The detailed calculations of the P_x values are omitted here. The steps involved in arriving at the calcalculated P_x values are as follows: 1—substituting into the main equation numerical values of A and c found for silver with the percentage of reduction examined, together with numerical values of R and t = 15 min; 2—finding numerical values of x from this equation for several assumed values of temperature, T; 3—substituting these values of x into the auxiliary equation, $x = (P_z - P_x)/(P_z - P_s)$, together with numerical values of P_s and P_z; and 4—solving this equation for P_x. The values of ultimate stress, proof stress, and 2 in. elongation thus obtained have been plotted against the assumed temperatures of annealing (filled double circles) in Figures 4, 5 and 6. The experimental data from Appendix 1 have also been plotted on the same diagram (open double circles). As may be seen from these figures, in which all results are collected, the calculated and experimental points lie as closely together as can be hoped for. Because the experimental and calculated curves coincide, a conclusion can be drawn that the equation used truly depicts the course of reannealing of silver, and that the numerical values of the activation energy as well as those of the frequency coefficients have been determined to a satisfactory degree.

PRODUCTION RECORDS *Broken*
with NILSON 4-SLIDE *Machine!*



Another example of
FASTER, LOWER COST FORMING
of Ribbon Metal Stock

★ *180 Terminal Contacts* Per Minute

★ *7 Separate Operations* Eliminated

A famous national manufacturer tripled production of the Terminal Contact illustrated above (in actual size) and reduced production costs proportionately by replacing several progress die set-ups with one Nilson S-3-F four side machine. *Seven separate operations were eliminated;* 180 completed contacts produced per minute. Time required for tooling changes was reduced 50% over similar type machines.

This example clearly shows the big savings you can make in overhead, maintenance, labor and time with a Nilson 4-slide!

Taking stock directly from the coil, NILSON metal ribbon stock four-slide machines automatically feed, straighten, pierce, blank, swage, stamp, coin, cut off and perform up to five forming operations with speed and accuracy. Built in five models with capacities up to 2½" wide and feed lengths up to 15". For specific recommendations on your wire and ribbon metal forming problems, send details, prints or samples of your operation to us when you request the bulletin.

THERE'S NOTHING LIKE A NILSON

Specialists in Wire Forming Equipment for Over 50 Years

THE A. H. NILSON MACHINE COMPANY

1510-J RAILROAD AVENUE, BRIDGEPORT 5, CONNECTICUT

OTHER NILSON PRODUCTS:

- Automatic chain-making machines
- Automatic staple forming machines
- Wire and Stock reels
- Foot Presses
- Wire straightening equipment
- Slide Feeds for Presses

Practical Aspects of the Findings

The fact, that the equation 1 quite well describes the course of changes encountered on annealing of work-hardened wires, not only in silver but also in other metals (1, 2, 4, 5, 7) opens quite a scope for its employment to more practical ends.

★ ★ ★

For instance, assume that it is necessary to know the exact behavior of this silver on annealing not for 15 minutes, but also for one minute, 30 minutes, one hour, and five hours. To secure such knowledge by conventional means, most of the experimental work described in this paper would have to be repeated four times,—at the cost of considerable expenditure of manpower and tying up of equipment. The answer sought can, instead be quickly obtained by repeating the steps listed in the chapter "Verification of the Treatment Employed" four times,—a work which may be completed in several hours by one person.

★ ★ ★

With the help of this equation, it is also possible to secure so-called isothermal annealing characteristics for any temperature of exposure by rather simple calculation. Such calculations have recently been done for a number of brands of commercial copper[6] and have been spot-checked by experiments that employed long time soaking at constant temperature. The agreement found between the calculated and experimental data was entirely satisfactory for many practical purposes.

★ ★ ★

A still other field of application of this treatment is of importance to designers who plan to use a work-hardened metal for work at higher than the ambient temperature. Without getting involved in any prolonged experimentation, a metallurgist can now calculate how long a time, the given material in its work-hardened state is capable of performing at any temperature named, before it loses 5 or 10% of its stress-carrying capacity.

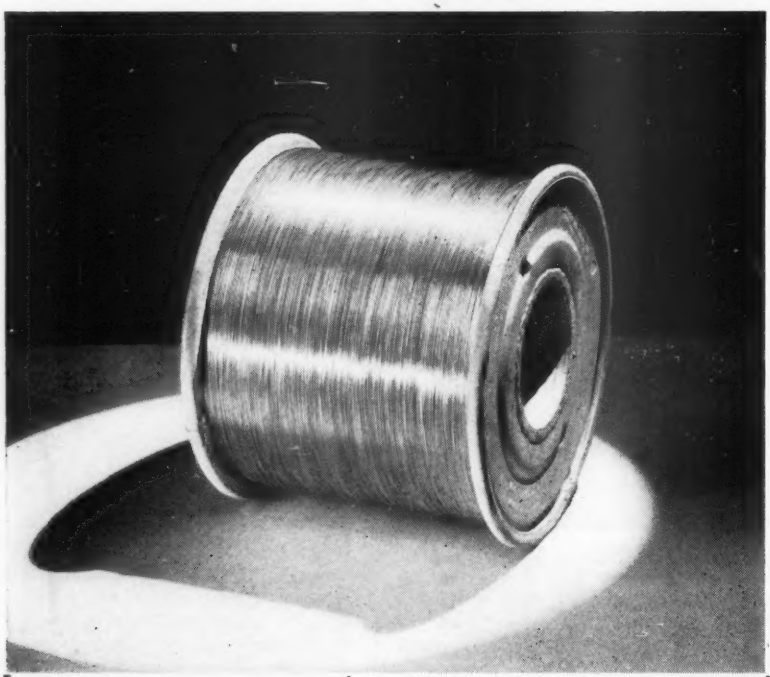
★ ★ ★

There are also some other possibilities opened by this treatment. The ones mentioned here adequately prove, that the Wire Industry, as well as other industries that make or process work-hardened metals have at their disposal a new, well founded treatment, that may speed up the solution of many practical problems.

★ ★ ★

References.

1. **Annales Acad. Sci. Techn. Varsovie 1937 v.4.p.270.**
2. **Revue de Metallurgie, 1939 vol. XXXIX p. 21.**
3. **Transactions, A.I.M.E. 1951, Journal of Metals 1951, p.981.**
4. **Journal Iron & Steel Institute 1945, P. 181.**
5. **The Physics of Powder Metallurgy 1951. P. 52. McGraw-Hill Co.**
6. **Transactions A.I.M.E. 1948, pp 175, 296.**



STAINLESS STEEL WIRE

Complete range of sizes from .0005" to .200". All tempers—hard, medium hard and soft. Bright lustrous finish. To your specifications, including wire of low magnetic permeability. In coils or on metal spools. Made in completely equipped plant for the manufacture of stainless steel wire exclusively.

KG WIRE CORP.
WORCESTER • MASSACHUSETTS

Firth Sterling Appoints New Advertising Agency

Kenneth D. Mann, President, **Firth Sterling Inc.,** Pittsburgh, Pa., manufacturers of tool and die steels, sintered carbides and high temperature materials, announced today the appointment of **Smith, Taylor & Jenkins, Inc.,** Pittsburgh, as its advertising agency. Thomas E. Pickering, sales promotion manager of Firth Sterling, said the Company's advertising program for 1953 would be broadened substantially, and would include advertising and publicity in trade magazines, newspapers, trade shows, and direct mail.

A Review of Recent Wire Patents

No. 2,612,797, FINAL-SHAPING ATTACHMENT FOR WIRE-DRAWING MACHINES, patented October 7, 1952, by Earl W. Johnston, Worcester, Mass., assignor to United States Steel Company, a corporation of New Jersey.

This apparatus comprises a pair of spaced-apart blocks mounted on a supporting plate for movement relative to each other, and having semi-cylindrical recesses in their adjacent edges located in opposed relation, cylindrical rolls of the same radius as the recesses loosely disposed therein and having sliding bearing engagement therewith, the blocks being adjustable to bring rolls into properly spaced relation. The rolls are retained in the recesses and have wire-engaging perimeters intermediate their ends and the recesses being relieved in the zone of the perimeters.

★ ★ ★

No. 2,612,912, MACHINE FOR STRAIGHTENING AND CUTTING WIRE, patented October 7, 1952 by Oliver R. Brekle, Birmingham, Ala., assignor to M and B Metal Products Company, Birmingham, Ala., a partnership.

After straightening by two gripping unit, the wire is severed into sections of predetermined length. There are 8 claims.

★ ★ ★

No. 2,613,412, CORSAGE PIN, patented October 14, 1952 by Blanche E. Robinson, Chicago, Ill.

This pin, having points at opposite ends of double bight and leg portions, is constructed of a single length of wire.

★ ★ ★

No. 2,613,416, PLASTERBOARD CLIP, patented October 14, 1952 by John S. Raynor, Jr., Philadelphia, Pa.

The clip is constructed of a single length of wire providing a reach rod and a rectangular body portion.

★ ★ ★

No. 2,613,426, APPARATUS FOR ADVANCING ELECTRICAL CORDAGE, patented October 14, 1952 by Robert T. Adams, Chatham, N. J., and Julius A. Wagner, Cleveland Heights, Ohio, assignors to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York.

Continuous cordage having enlarged portions at spaced points is advanced by a member having a notch therein of such a size as to permit the small portions of such cordage to slip therethrough and to prevent the enlarged portions from slipping therethrough.

★ ★ ★

No. 2,613,427, ARTICLE FORMING APPARATUS, patented October 14, 1952 by Robert T. Adams, Chatham, N. J., and Julius A. Wagner, Cleveland Heights, Ohio, assignors to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York.

Electric cords are made by this machine from continuous cordage which comprises a number of wire conductors with covered sections and uncovered sections.

★ ★ ★

No. 2,613,560, WIRE ROLLING MILL, patented October 14, 1952 by Jean Rozieres, Saint-Cloud, France.

More specifically, a bearing structure is provided for working rolls journalled in needle roller bearings, carried in sliding members in the mill frame.

★ ★ ★

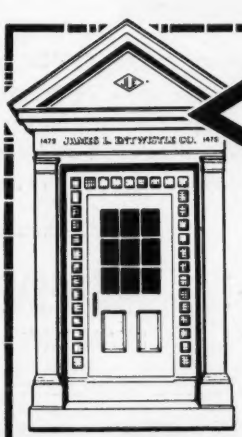
No. 2,613,732, SEAT SPRING, patented October 14, 1952 by Kenneth R. Dye, Marine City, and Maurice Stubnitz, Adrian, Mich., assignors to Stubnitz-Greene Spring Corporation, Adrian, Mich., a corporation of Michigan.

A seat wire spring structure for stacking and telescoping for storage or transportation is provided, by this patent.

★ ★ ★

No. 2,613,733, SPRING CONSTRUCTION, patented October 14, 1952 by Andrew Mouw, Huntington Woods, Mich., assignor to No-Sag Spring Company, Detroit, Mich., a corporation of Michigan.

More specifically the patent covers a U-shaped border wire, held associated



JLE

SERVING THE WIRE INDUSTRY THROUGHOUT THE WORLD

- Caterpillar Pull-outs
- Standard Sets of Spark-Testing Equipment
- Take-ups and Re-spoolers
- Reelers
- Coilers
- Spoolers
- Collapsible Coiling Reels
- Wire Sparkers and Accessories
- Hand Locators
- Electrode Units and Stands
- Measuring Machines, Counters and Accessories
- Wire Guide Units
- Pay-off Reels Stands
- Electronic Devices
- Shaftless Take-ups and Payoffs
- Wire Pre-Heater
- Disk Brakes and Controls, Drag Units and Slip Clutches
- Wire Marking Machines, Type Strips, Inks
- Labelling Machines
- Pneumatic Equipment and Controls
- Special Machinery for the Wire Industry
- Hydraulic Equipment and Controls
- Hi-Pot Test Sets
- Cable Handling Equipment for Warehouse Use

See page 1280 for News of the JLE Multiple Wire Heads for Extruders

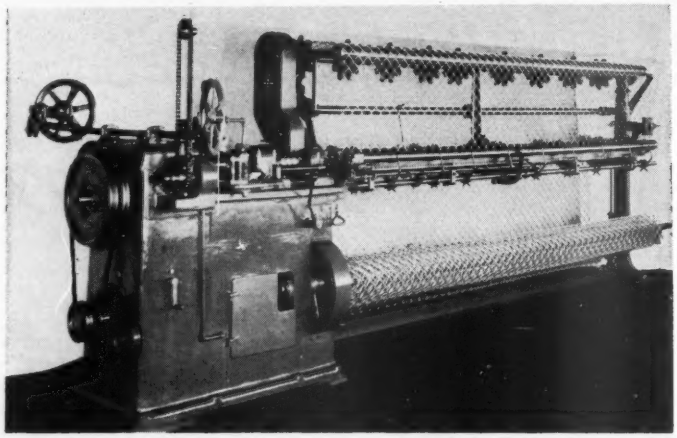
JAMES L. ENTWISTLE CO.

1475 ELMWOOD AVE. PROVIDENCE 7, RHODE ISLAND, U. S. A.

European & South American Agents: M. CASTELLVI, INC. 150 BROADWAY, NEW YORK 38, NEW YORK

British Associate: GENERAL ENGINEERING CO., LTD. BURY ROAD, RADCLIFFE, LANCASTER, ENGLAND

JLE JLE JLE JLE JLE



HUGHESVILLE MACHINE
& TOOL CO.
TAKES PLEASURE IN ANNOUNCING
THE
EXCLUSIVE MANUFACTURE
OF THE
ARTHUR BLASHILL LINE
OF AUTOMATIC
CHAIN LINK FENCE MACHINES
AND ACCESSORIES

Illustrated above is the new No. 2A "CHAIN LINK" WIRE FENCE and NETTING MACHINE. This is a Twin-Spiral Type — fully automatic — completely modern in design, material and construction. (Patents issued and pending). Has accurate spindle stops for cut-off. One second covers the cut-off "transfer" of the netting and the "knuckling-in" of the wire ends on both edges. Fence "wind-up" at front, beside the operator. Ball and roller bearings throughout. Exact control at all speeds.

30% to 50% more production. Lower labor, power and maintenance costs. Less floor space.

Regular range: 7 to 14 ga. wire. With extra equipment, will weave No. 5 or 6 ga. wire.

HUGHESVILLE MACHINE & TOOL CO.
54 ACADEMY ST. • HUGHESVILLE, PA.

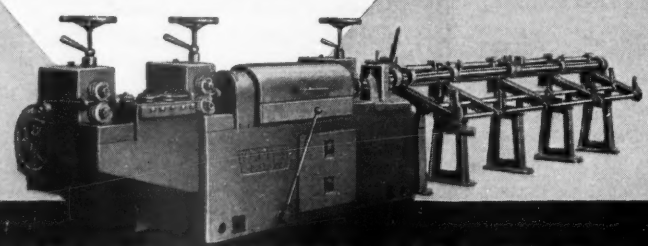
WAFIOS
WIRE-WORKING MACHINERY

Wire Netting Machines for Chain Link, Hexagonal Mesh, Poultry Netting, Field Fence. Crimping, Barb Wire and Staple Machines. Spring Coilers. Spring End Grinding Automatics. Loop Benders. Upholstery Spring and Wire Mattress Machines. Wire Nail Machinery. Chain Formers. Chain Welders. Straightening and Cutting Machines. Multi-Slide Wire and Strip Forming Machines. Special Machinery for the making of Paper Clips, Lock Washers, Bale Ties, Key Rings, Tin Openers, Wire Bag Ties, etc. Automatics for Flexible Metallic Tubing.

Sole Agents for Australia and New Zealand: Bliss & Reels Co. Pty. Ltd., 64-66 Little Bourke Street, Melbourne C. 1, Australia.

WAFIOS

SINCE 1893



MASCHINENFABRIK WAFIOS
WAGNER, FICKER & SCHMID **REUTLINGEN 3 / WURTT. GERMANY**

parallel sinuous springs held together with U-shaped wire spring elements.

★ ★ ★

No. 2,614,172, HIGH IMPEDANCE SHIELDED TWIN CONDUCTOR CABLE, patented October 14, 1952 by Eugene Willis Greenfield, Hastings-on-Hudson, and Alfred Emil Widmer, Ossining, N. Y., assignors to Anaconda Wire and Cable Company, a corporation of Delaware.

The cable comprises a pair of wire conductors, each being insulated by being axially supported in and spaced from the inner surface of a tube or dielectric material, and a metallic shield of nonmagnetic material surrounding the pair of insulated conductors, characterized in that each conductor comprises a wire having a core of ferromagnetic metal and a layer of metal of high electrical conductivity surrounding this core, and further characterized in that the region between conductors inside the shield is free of any ferromagnetic material.

★ ★ ★

No. 2,614,414, MULTIPLE SPRING TESTER, patented October 21, 1952 by Eugene Toublanc, Nantes, France.

This device is for testing watch mainsprings by alternately winding and unwinding them.

★ ★ ★

No. 2,614,599, WIRE ANTISKID DEVICE, patented October 21, 1952 by Charles A. Sivon, Painesville, Ohio.

A corrugated zig-zag wire structure is provided, embedded in a molded carrier. There are 6 claims.

★ ★ ★

No. 2,614,766, WIRE REELING APPARATUS, patented October 21, 1952 by Hermann Bocher, Cologne-Kalk, Germany.

The reel is provided for selective low or high speed winding.

★ ★ ★

No. 2,614,801, WIRE HOLDING AND PRESTRESSING DEVICE, patented October 21, 1952 by Oswald Mazzei, New York, N. Y., assignor to Aircraft Hardware Mfg. Co., Inc., New York, N. Y., a corporation of New York.

Included in this device are a casing, a head section at one end of the casing, wire holding means reciprocable therein, a shaft portion extending from the wire holding means and projecting from the head section of the casing, and a take up associated with the shaft portion coacting with the head section to manipulate the wire holding means within the casing. The wire holding means includes a reciprocable block, a wire gripping dog pivotally mounted on the block, spaced studs designed to support an end section of the wire extending into the casing, and a cam within the casing operative to manipulate the dog into gripping engagement with the stud spanning portion of the wire end section.

★ ★ ★

No. 2,615,478, MACHINE FOR FORMING SPRINGS HAVING CLOSED ENDS, patented October 28, 1952 by Henry Hopkes, Jr., Grosse Pointe Farms, Mich., assignor to No-Sag Spring Company, Detroit, Mich., a corporation of Michigan.

More specifically the invention covers a device for severing strips of sinuous wire spring stock.

★ ★ ★

No. 2,615,815, CORROSION INHIBITING COMPOSITION, patented October 28, 1952 by Gerald David Galvin, and Alexander Espie McAulay, Fulham, England, assignors to Shell Development Company, San Francisco, Calif., a corporation of Delaware.

This composition comprises: limed petroleum residue rich in natural cyclic acids 20%; lanolin—10%; sodium salt of oil-soluble petroleum sulfonic acid derived from raffinate fraction of a solvent-treated oil—3%; zinc naphthenate—5%; diacetone alcohol—2%; and white spirits—Balance.

★ ★ ★

No. 2,615,840, ELECTROLYTHIC METHOD TO REMOVE RUST, patented October 28, 1952 by Alfred Arthur Grahame Chapman, London, England.

The method comprises immersing a metal article in an electrolytic bath and passing an electric current between an anode in the bath and the article as a cathode, this bath consisting essentially of an aqueous solution of the following compounds:—alkali metal hydroxide—2 to 3 1/2 lbs./gal.; alkali metal cyanide—2 to 4 oz./gal.; alkali metal chloride—1 to 8 oz./gal.; alkali metal fluoride—1/4 to 2 oz./gal.; wetting agent—1/16 to 14 oz./gal.; and alkali metal metasilicate or aluminate, 2 to 4 oz./gal.

Roebling Moves Cleveland Warehouse

John A. Roebling's Sons Co., Trenton, N. J., has moved its Cleveland offices and warehouse to 13225 Lakewood Heights Blvd., Cleveland 7, Ohio.

NRM

"JOB-DESIGNED" WIRE COVERING EQUIPMENT . . .

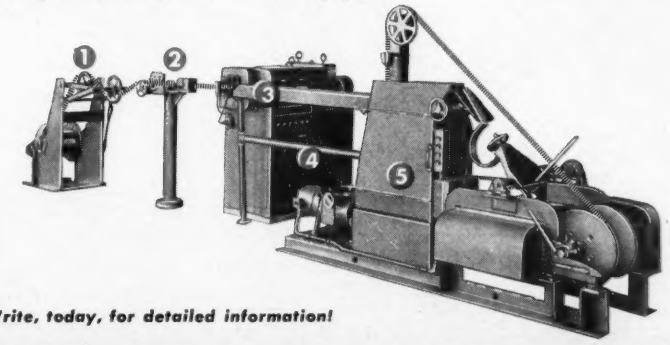
When it comes to covering wire with plastics, you can't beat NRM extruders and their tailormade accessories. For NRM equipment is specifically designed to do an exact job of insulation with any of the wire covering plastics — including Nylon.

Pictured here is the equipment designed to cover wire with vinyls, or polyethylene. With a few simple changes, this same basic machinery can be used with Nylon.

Important features of NRM equipment include rugged electrically heated extruders with built-in "Balanced Heat Control" for exact temperature control; precision-built, alloy steel feed screws with flame hardened flight surfaces designed to eliminate "pulsation"; unique die and front flange assembly for faster die and screen changes and easier "change-overs"; and, supply reels, wire straighteners, wire preheaters, and cooling and take-up units engineered to give a fast, continuous production at close tolerances.

Important, too, are the quality workmanship and years of experience that go into all NRM equipment.

1. Supply Reel Stand
2. Wire Straightener
3. 1½" Electrically Heated Plastics Extruder
4. Cooling Trough
5. Combination Take-Up and Cooling Unit



Write, today, for detailed information!

2040

NATIONAL RUBBER MACHINERY CO.

General Offices & Engineering Laboratories: Akron 8, Ohio
East: 1180 Raymond Blvd., Newark, N. J.
West: S. M. Kipp, Box 441, Pasadena 18, Calif.
Export: Omni Products Corp., 460 Fourth Ave., New York 16, N. Y.

Creative Engineering

Discussion of Aluminum Conductor Connectors

(*Continued from page* 1297)

In response to an explanatory letter of mine, Mr. Ridpath wrote a letter dated August 25, and we have his permission to publish it. This reads:

"I was extremely interested to have your letter of the 15th August, and I should add, extremely surprised to learn of the amount of misconception you report on the question of the reliability of fittings for Aluminum in the U.S.A. We have had, of course, our teething troubles in this country, but experience has shown that the principle of using an insulating washer to protect the bimetallic junction of an Aluminum-copper fitting is a sound one. This view is not based on a few years trial but on the experience of something like 25 years. It is significant that the unsuccessful experiments of the Pacific Gas and Electric Co. did not include this type of fitting which is universal in this country.

"When experiments, which are bound to have a wide publicity, are undertaken, a serious responsibility devolves on those making the experiments to see that the ground is properly covered. In the case under discussion, this has not been done and the conclusions drawn are, therefore, open to serious criticism. As you are aware, my more detailed views were given in my letter to the London "Electrical Times" of the 17th July, last.

"We are, as you know, notoriously conservative in this country, but we are going right ahead with All-Aluminum Conductors for L.T. distribution at 240 volts, and we are also supplying similar material to tropical and sub-tropical areas. We have no hesitation in recommending aluminum for use by the sea even in tropical climates with this improviso—as long as the fittings to be used are of approved design and as long as the conductors are internally greased.

"Finally, I cannot lay too much stress on this question of design, and that is one reason why we have always taken responsibility for the supply of fittings with our conductor; the life of the best conductor can be wrecked at an early age by badly designed fittings.

"I certainly wish you success in your efforts to get more of the right type marketed in the U.S.A."

★ ★ ★

In conclusion, I would wish to re-emphasize that accessory designs, and installation methods *are* available to provide adequate service safeguards, if use will be made of the procedures developed in Europe. It does appear that history will repeat itself, and the accessory problems that were inherent to the successful use of ACSR in transmission, may have to be resolved for aluminum secondary distribution by the Aluminum producers, setting up to produce a range of suitable fittings. Today we are not even starting from the development stage attained in Europe; when we do—and nothing can or will deter it—I am confident we will develop the fittings that will cost less than copper alternatives.

★ ★ ★

The faults are not inherent to the Aluminum Conductor, they are in the poorly designed fittings extant; there are today, unfortunately, more unsuitable fittings going onto aluminum conductors than good fittings.

★ ★ ★

The Aluminum Wire and Cable Company of Port Tennant together with other well known Continental manufacturers of Aluminum Conductor accessories have a full range of connectors of all types for every duty and are readily available from them. At some future date if industry demands, and acceptance, warrants it, arrangements could be made to stock or fabricate in the U. S. these proven designs.

★ ★ ★

Aluminum problems can best be solved by the Primary Aluminum producers; they are the most competent to pass judgment.

The Federal Manufacturing Company

Extends to its many friends in the Wire Industry its best wishes for a

Merry Christmas

and

Prosperous and Happy New Year

We take this opportunity to thank you, our customers, for your patronage and to pledge you our continued best efforts to make Federal Equipment worthy of your future confidence.

FEDERAL EQUIPMENT

PAY-OFFS
TAKE-UPS
CAPSTANS
DOUBLE TAKE-UPS

Federal Manufacturing Co.

SPECIAL WIRE MACHINERY

236-240 Hall Avenue, Wallingford, Conn.

Electrolytic Alkaline Descaling Process

Enthone, Inc., Dept. WWP, 442 Elm Street, New Haven, Conn., has announced that their alkaline electrolytic process for derusting of metals will accomplish effective and complete scale removal of metals by the use of periodic reverse current. Cathodic treatment of rusted steel and alloy steel parts accomplishes rapid rust removal without any attack upon the base metal. This makes the process ideal for removal of rust where no etching can be tolerated on the base metal, such as highly finished tools, rolls, ball bearings and high carbon steel parts.

★ ★ ★

The application of periodic reverse current, in which the work is made the anode from 5 to 30 seconds and then the cathode for a like period of time, has enabled effective, clean removal of black heat treat, quenching and other scales on steel and alloy steels more effectively than acid pickling. Bulk descaling of small parts has been successfully accomplished in oblique tumbling barrels using a carbon electrode. It has also been reported that the periodic reverse alkaline descaling process produces a better surface for hard chromium plating with less danger of hydrogen embrittlement than when acid descaling is done. The application of high current densities of the order of 100 to 500 amp/ft.^{2} allows rapid scale removal from high carbon steel wire, accomplishing the descaling in from 1 to 2 minutes.

★ ★ ★

Another application of the alkaline derusting or descaling process is smut removal of metal. Many high carbon steels are blackened by the use of acids, due to liberation of carbon smut. Alloy steels containing carbides are also blackened by acids. The use of periodic reverse current with the alkaline derusting process permits the removal of scale with the removal of carbon smut. The material for accomplishing electrolytic alkaline derusting and descaling is sold under the trade designation of Enthone Compound 134. It is used in a concentration ranging from 1—3 lb/gal. Current densities can be employed ranging from 5 to several hundred amperes per square foot.

★ ★ ★

Further information can be secured in a technical bulletin by writing to: Enthone, Inc.

New Process for Making Screw Nails

A patented device for forming threads in the wire, eliminating the conventional method of rolling the threads in a separate operation, has been announced by **David R. Grossman Company,** 155 East 44th Street, New York 17, N. Y.

★ ★ ★

The process is one of drawing the wire to form the threads continuously, after which the wire is fed into a nail making machine for upsetting the heads and cutting the points, exactly as in the case of round wire nails. Screw nails have thus been made of steel, aluminum, brass and other metals at costs said to be substantially lower than by present methods.

★ ★ ★

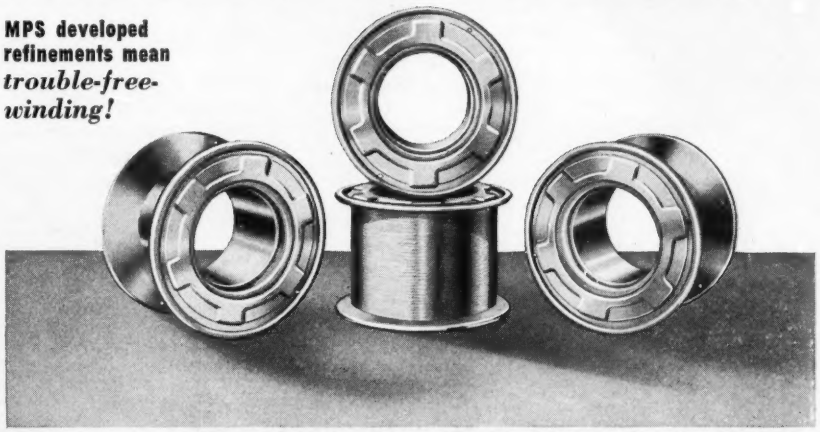
Full information will be furnished to nail manufacturers upon request.

Spool Headaches Eliminated

when MPS. HEAVY DUTY NO-CREV SPOOLS

are used in the drawing of the finest wire at high speed

MPS developed refinements mean *trouble-free-winding!*



SIZES

*6 x 3½ x 3½
6 x 6 x 3½
6½ x 3½ x 3½
6½ x 6 x 3½
8 x 6 x 4½
8 x 8½ x 4½
and others

*Illustrated

MOSSBERG PRESSED STEEL CORP.

18 WEST STREET ATTLEBORO, MASSACHUSETTS, U.S.A. Telephone Attleboro 1-0847 & 1-0848

James Day (Machinery), Ltd., 28 Maddox Street, London, W. I. England # 104

MEYER, ROTH + PASTOR

MASCHINENFABRIK

KÖLN-RADERBERG

GERMANY

A new

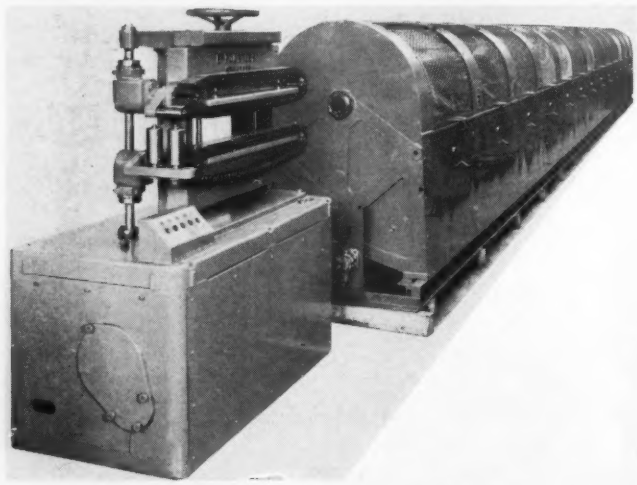
Universal Multi-Slide Bending Machine

for the full-automatical and economical manufacture of mass-produced articles of all kinds from wire and strip.

Special features:

- Vertical structure, covered construction, smallest space requirements.
- Bending slides positively moved and directly steered, therefore high output and fool-proof operation.
- Exact wire feed by a special steered pressing device.
- Simple shaped tools, easy to supervise, to adjust, and to exchange.
- Possibility to use further slides for unusual bending shapes.
- Additional equipment for stamping, punching, and piercing.

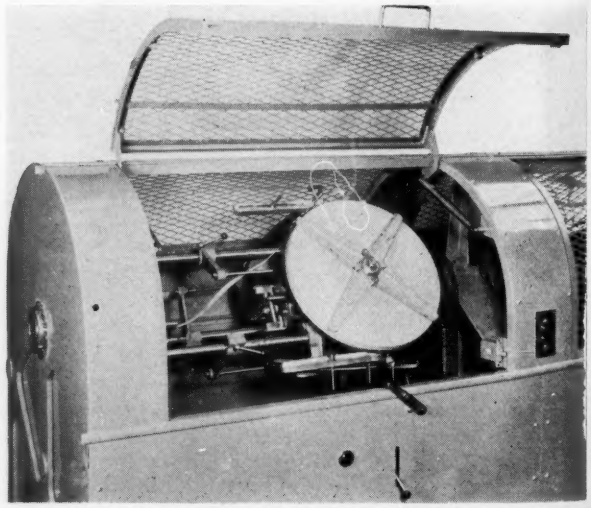
Please enquire for our detailed catalogue-sheet which will inform you about working ranges and employments of our Multi-Slide Bending Automatics.



ARE YOU SURE YOU HAVE THE BEST TAPING MACHINE FOR LOW AND MEDIUM TENSIONS?

HERE IS OUR No. 8 MACHINE:

- 3" and 4" bore.
- 20" paper cheese diameter.
- 400 RPM.
- Stop motion.



- Constant paper tension easy to predetermine.
- Haul-off by our caterpillar, Maillefer patented.
- Lockheed braked.
- Handling large drums.

ASK FOR INFORMATION

POURTIER MACHINES

153, rue Galliéni, ROMAINVILLE (Seine) FRANCE

Cold Pressure Welding of Wire

(*Continued from page* 1299)

but aluminum to copper, aluminum to aluminum and copper to copper are presently the principal applications.

★ ★ ★

The technique centers around the fact that if metals are forced to flow under sufficiently substantial pressure, it is possible to get the grains of the parts to be cold welded into such intimate contact that they unite and flow together at their surfaces to form a homogeneous unit that is described as "a true weld from the standpoint of an engineer."

★ ★ ★

The highest degree of success so far has been with aluminum and copper and more recently work has been done that has added wire as a category of metal forms that can be butt, lap or cross-wire welded by means of cold pressure. One of the interesting new applications is the welding of connectors to wire or stranded cable. Once made, such connectors become an integral part of the conductor. They cannot become loose nor are they subject to electrolysis. This type of weld can be made by electricians in building wiring, by linemen in making transmission connections or by assembly operatives in hook-up work, using a special tool not much larger than a pair of pliers.

★ ★ ★

The question of how strong a pressure weld may be is certain to arise. In general, tests have indicated that such joints are as strong as those produced by the best orthodox electric welding. Once a weld is made, the point of junction becomes as strong or stronger than other points in the wire. Repeated tests have shown that a tensile stress sufficient to break the wire will occur at some other point than the weld. As in all welds, particularly in other than butt or lap welds, the design of the product for cold welding will have a decided bearing on joint strength.

★ ★ ★

Butt welds of wire are, with the proper equipment, exceedingly simple to make and practically foolproof. The whole operation, from the insertion of the wires in the gripper jaws, to the upsetting action by which the weld is effected, is a matter of seconds only. The wire emerges with a burr somewhat similar in appearance to that produced by an electrical resistance butt welding operation. The burr may be removed in a similar manner. Such wire can be drawn and in any annealing operation the cold welded portion will resume a completely normal grain structure, comparable to that of other portions of the wire.

★ ★ ★

Joints of similar or dissimilar metals will have a slightly higher electrical resistance until annealed, but where wire is not to be further drawn, allowance can be made for this in the design of the joint and weld. This would be particularly true where the wires are lap welded, where any cross-section desired may be obtained within the limits of the wire gauges, of course.

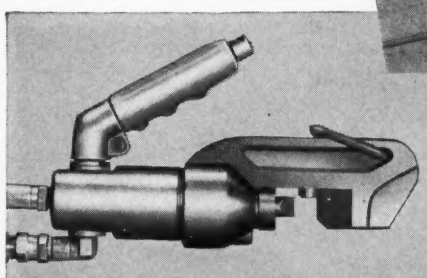
★ ★ ★

There is no theoretical limit as to form or thickness of the metals, and foils may be welded as readily and easily as thick plates; parts of varying sizes and forms may be joined, as, for example, a small wire to a large one, wire cloth to strip, wire to tubing and so on. Welded parts must be clean, that is, free from

Fast, Production Cutting of STEEL ROD and WIRE

Manco Guillotine
MODEL 200E

- Capacity, ½" steel rod
- Fast—only ½ second per cut
- Easy-action thumb button valve—no solenoids
- Eliminates operator fatigue



The Guillotine Model 200-E is a proven performer now used in many rod mills. Lightweight cutting head weighs only 10 lbs. High-speed electric hydraulic pump provides ten tons thrust. Also available with a variety of other hydraulic pump units, including compressed air and manually operated pumps. Unit can also be adapted for riveting, punching, swedging. Write for complete information.

Write today

DEPT. W-12

MANCO MFG. CO.

BRADLEY, ILLINOIS

dampness or soils and, in the case of aluminum, the surfaces must be free from a heavy oxide coating. A surface that has been prepared for welding may stand as much as 24 hours before being welded, for up to that time the oxide that has reformed will be so thin as not to interfere with the making of a sound weld. Indifferent or poor welds will not show up later, for if a surface has not been cleaned properly, a weld will not be effected and the operator will note the failure at once.

★ ★ ★

Pressures required are obviously above the flow point of the metal and welding can be done with any tools that can provide sufficient pressure. Excessive pressure, however, will result in undue deformation of the metal, and hence uniformly satisfactory welds are best performed with equipment particularly designed for the operation. While special simple tools have already been developed, a number of concerns are now working on new equipment that will handle more varied and complicated jobs.

★ ★ ★

The applications of cold pressure welding are now many and are now being performed in the manufacturing plants of the company responsible for the discovery and development of the process in England. The company has expressed its willingness to cooperate through its laboratories with businesses in working out those techniques that may be best suited to the performance of special operations.

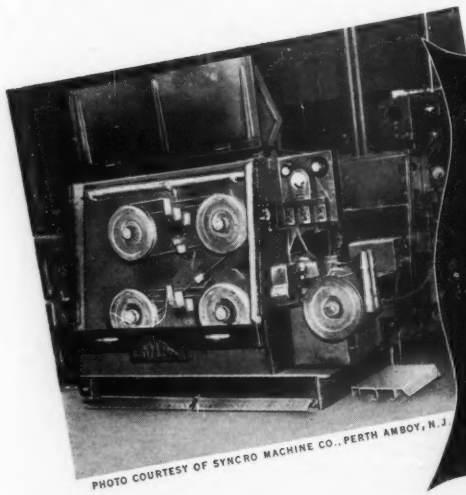


PHOTO COURTESY OF SYNCRO MACHINE CO., PERTH AMBOY, N. J.

NOPCO'S
DURPON*
Drawing Compounds
give
TWICE THE SERVICE
you can expect from
conventional compounds

Nopco's DURPON drawing compounds—specifically developed for wet drawing of nonferrous wire, rods and tubes—are all on the alkaline side, to assure optimum die life, and are natural lubricants.

But the special advantage these improved compounds offer is *emulsion stability*. For incorporated into each Durpon product is a stabilizing additive which prevents breakdown of the effective drawing ingredients when the bath becomes contaminated by dirt, small amounts of carry-over acid and metallic particles.

Because Durpon additives help maintain normal balance between soap and lubricant, the stability of the drawing emulsion during recirculation is increased and the useful life of the emulsion lengthened.

As a matter of fact, Nopco® Durpon compounds not only provide optimum lubrication, but retain their initial degree of performance for *twice as long* as conventional compounds.

If you draw nonferrous materials, Durpon compounds will assure you *better drawing results* and *reduced drawing costs.*

Immediately available are:

DURPON
for intermediate gauge wire

DURPON L
for heavy wire, rods, and tubes

DURPON FW
for fine wire

Fill out and mail the coupon. We'll send you a technical bulletin and trial-size order promptly.

® Reg. U.S. Pat. Off. *Trademark

NOPCO
CHEMICAL COMPANY
Harrison, New Jersey

BOSTON · CHICAGO · CEDARTOWN, GA. · RICHMOND, CALIF.

NOPCO CHEMICAL COMPANY, Harrison, New Jersey
Gentlemen: Please send me a copy of your Bulletin giving information about Nopco DURPON Drawing Compounds.
Name.....Title.....
Company.....
Address.....
City.....Zone.....State.....

Magnet Wire Container Wins Packaging Award At Chicago Meeting

Prize winning packaging material winners at the seventh annual Industrial Packaging and Handling Exposition held at the Coliseum in Chicago, October 14th, 15th and 16th were announced at the annual award dinner held at the Hotel Sherman, Wednesday night.

★ ★ ★

First prize in group five—magnet wire packing—was awarded to **T. R. Polglass,** purchasing agent, **Anaconda Wire & Cable Company,** Muskegon, Mich. **Edward J. Runzer, General Electric Company,** Erie, Pa., won first prize in group seven with a box lifter.

★ ★ ★

A moulded shipping case for spools of magnet wire won first place for Mr. Polglass. The product is warehoused, shipped direct to the user via domestic carrier. The advantages of the container are: damage to wire eliminated; container conforms to carrier requirements and commodity classifications; molded case weighs one-third of wooden cases replaced; no interior or extra packing required; spools easier to pack and unpack; when opened, molded cases may be a tray for easy handling of spools in work area; cases nest in storage when empty in one-third the space required for wooden cases; cases are returnable and re-usable and may be palletized; sizable reduction in freight costs results from lighter tare weight; makes possible the bulk weighing of magnet wire for the first time as result of closely controlled tare weight.

Making Aluminum Cable at Copper Plant

At the Great Falls, Montana, mill of **Anaconda Wire & Cable Company,** machines which once produced copper wire and cable products exclusively are also now turning out aluminum conductors. This machine is cabling a stranded aluminum steel-reinforced conductor. Copper cables on reels are shown in background.

Increased production of conductors made of both metals is expected here. The Greater Butte (Mont.) copper project of Anaconda Copper Mining Company, the parent organization, is now yielding over 6,000 tons of ore daily. By the end of the year, it will be producing at the rate of 10,000 tons daily. This output will be increased as rapidly as possible to an eventual yield of 15,000 tons of ore per day, thus augmenting the normal copper supply of Butte mines by an additional 90,000,000 pounds of refined copper yearly.

★ ★ ★

Construction preliminaries are under way on Anaconda's $45,000,000 primary aluminum plant at Columbia Falls, Montana. The two potline plant, with an estimated capacity of 50,000 tons of aluminum per year is scheduled for completion early in 1954.

Bulletin on Phosphate Coatings

A new bulletin, Technical Data Sheet No. P-100 46 has been issued by **American Chemical Paint Co.,** Ambler, Pa., describing their phosphate coating chemicals and processes for paint bonding, rust proofing, protecting friction surfaces and improving drawing and extrusion.

★ ★ ★

In text, illustrations and charts practical information on how to use these chemicals is described for the benefit of those who have problems in each of the categories mentioned.

★ ★ ★

Copies will be sent upon request to American Chemical Paint Company.

New Polymer for Wire and Cable

The Dewey and Almy Chemical Company, Cambridge, Mass., has announced that its Organic Chemicals Division is producing a new high styrene copolymer—No. 43G—for use especially in soling, floor tile and wire and cable insulation.

★ ★ ★

The new polymer provides easier processing, harder stocks and imparts high abrasion resistance with greater flex life in both low and high gravity soling stocks. Another advantage of 43G is the greater stability in storage of uncured stocks.

★ ★ ★

A new bulletin is available, illustrating graphically the properties imparted by the new material.

★ ★ ★

EW

HIGH PRODUCTION METAL LOOMS

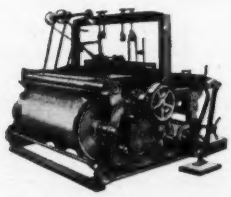
S.A.M.P.

Type BM for mosquito & fly nets, paste factories, armour plate glass, corn sieves, etc.

Type XL for flour mills, chemical and industrial works, etc.

Type CP for "Rabitz" cloth, plastering work, armour plate glass, etc.

Type CM for extra strong metal cloth for sieves, grain, rice, armour plate glass.



Jarach-Guetta, Industrial Overseas Co., Inc.

120, Wall Street, New York 5, N.Y.

General Agents of EMILIO WARTENWEILER,

Via Pergolesi 18, MILAN (Italy)

In Memoriam

Kenneth B. Lewis

1882-1952

After a long illness, **Kenneth B. Lewis** passed on quietly on Tuesday, November 25th, 1952.

★ ★ ★

He had been one of the outstanding and dominant men of our industry for nearly half a century, was widely known throughout the world wherever wire was made and regarded with affection, esteem and respect whithersoever he went, for in no single other person was there embodied so broad an understanding of the wire industry, with its many and varied facets—technical, practical and human.

★ ★ ★

Up to very recent years Mr. Lewis had been a generous contributor to the literature on wire processing through his many articles written for *Wire and Wire Products*, of which he was associate editor for thirty years. His last series of articles concerned the history and development of the early wire companies, tracing the wire pioneers in America down into a number of important companies that developed from these modest beginnings. A few years ago he gained some note by translating and adapting to American practice Maurice Bonzel's "Steel Wire," which at the time was the only book on the subject of wire making in existence. The last and final gift of his talents took the form of a fine book, "Steel Wire in America", published in the Spring of this year.

★ ★ ★

Mr. Lewis had steel in his blood, having worked in steel and wire mills in his early days, following his graduation from Harvard University. For some fifteen years he was connected with the Morgan Construction Company, traveling extensively through Europe and America. He was largely responsible for the development of rod rolling and wire drawing machinery as we know it today. Through his Morgan affiliation he became personally acquainted with wire mill executives and operatives throughout the country, which stood him in good stead when, in 1932, he left them to become a wire mill consulting engineer, in which work he was engaged at the time of his death. He had designed steel mills in Belgium, South Africa, France, India and in this country.

★ ★ ★

A natural scholar and an assiduous student of history, with his prodigious memory, Mr. Lewis was a fountainhead of wire lore, much of which, fortunately, he has recorded for posterity in his highly readable writings.

★ ★ ★

Ken Lewis was a charter member of The Wire Association and had been active in its affairs from its organization in 1930 to very recently.

★ ★ ★

A great personality has passed on, well beyond the allotted span of three score and ten. He will be missed, but more—he will be remembered! Ken left his mark in the world, a mark that the years will brighten with the memories of a full, rich life of service to his fellow men in his chosen field of vocation.

Paul B. Morgan

Paul B. Morgan, an outstanding personality in the steel industry and Chairman of the Board of the Morgan Construction Company, Worcester, Mass., died at his home in Worcester on November 3, 1952, at the age of 83.

★ ★ ★

Mr. Morgan was a patron of the arts and a civic leader, as well as an industrialist. He was active in many fields until recent years when failing health forced him to modify his schedule.

★ ★ ★

His father, Charles Hill Morgan, who founded the Morgan Construction Co., was instrumental in the development of Worcester Polytechnic Institute and active in civic welfare and religious activities. His son carried on his father's work.

★ ★ ★

Born in Worcester, May 7, 1869, his mother was Rebecca Ann (Beagary) Morgan, a native of Philadelphia.

★ ★ ★

He received his early education in Worcester schools and at Worcester Academy, from which he was graduated in 1887 and in which he had a life-long interest, having served as a trustee and president of the board for more than 25 years.

★ ★ ★

He attended Worcester Polytechnic Institute from which he was graduated in 1890 with the degree of bachelor of science. He was for many years a trustee of Worcester Tech where his father established the Washburn shops.

★ ★ ★

After his graduation from Tech, he went to Europe to study the iron and steel industry and took a special course in metallurgy and chemistry in the Royal School of Mines at Stockholm, Sweden. He also gained some practical experience in the celebrated Munkfors Works of the Uddeholm Co. in Sweden.

★ ★ ★

Returning to Worcester, he went into business with his father, who had founded the Morgan Construction Co. in 1888, and in the operation of the Morgan Spring Co. The engineering concern was incorporated in 1891.

Mr. Morgan served successively as metallurgical engineer, secretary, assistant treasurer, treasurer and president. His father died in 1911. He was president of the Morgan Spring Co. until its merger with the Wickwire Spencer Steel Corp., in 1919, of which company he was long a director.

★ ★ ★

Under his management, those companies expanded considerably, both in their production and in additions to their plants and equipment. He resigned as president of the Morgan company in 1941. His son, Philip M. Morgan is now president.

★ ★ ★

Mr. Morgan was widely known for his administrative ability, as was his father. He was responsible for the development of many improvements in the field of metals and engineering.

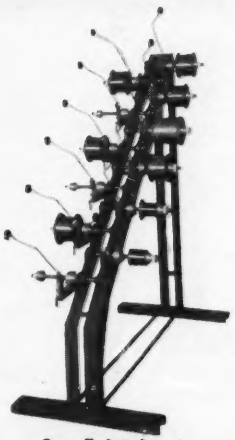
★ ★ ★

In addition to his son, Philip M., he leaves three other sons, Paul B. Jr., of Worcester, treasurer of Morgan Construction Co., Dr. Charles Hill Morgan, professor of archeology at Amherst College and Prof. Vincent Morgan, professor of music at Amherst College; one daughter, Elizabeth, wife of Kenneth D. Robertson of Concord and 13 grandchildren and seven great-grandchildren.

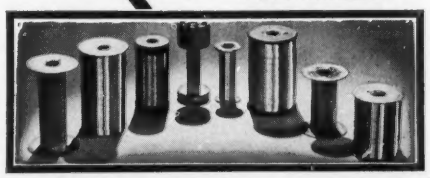
STANDARD UNI-DRIVE WIRE WINDER.

INCREASE YOUR PRODUCTION
WITH THIS WINDER

Wire Winder



Pay-off Attachment



Various types of supply packages that may be wound on Standard Uni-Drive Wire Winder.

PAYOFF

Our payoff attachment is made with self-aligning ball bearings and a compensating attachment to control the tension of each end. Applies same tension when spool is empty as when full.

The new Uni-Drive Winder with Payoff Attachment is new in design and incorporates several improved and tested features.
Production is stepped up through increased speed. It produces smooth, even and accurately wound spools of wire in single or multiple ends. All strands parallel—no over or under-winding. Automatic Stop-Motion controls each strand. Compensating attachment produces perfectly controlled tension. Traverse adjustable from 1¾" to 5½" between spool heads without changing cam.
Designed especially for winding wire to be braided and shielded for electrical conductors up to ¾" diameter.
Payoff can be equipped with Carboloy Guide Inserts at additional cost.

STANDARD MILL SUPPLY
PAWTUCKET, R.I., 1064-1080 Main St.
NEW YORK, N.Y., 6708 Empire State Bldg.
CHARLOTTE, N. C., 2319 Hutchison Ave.

New Stand-By Electric Plant

A new ultra-modern and electric generating plant, engineered primarily for emergency stand-by service, is announced by the **Universal Motor Company**, Oshkosh, Wisconsin. This new model has a 10 KW capacity suiting it for a wide range of applications in commercial buildings, industrial plants, construction projects, etc. It is available with electric starting or can be supplied with controls which automatically start the plant the instant regular power fails.

★ ★ ★

An important feature of this model is its four cylinder air cooled gasoline engine. Not having a water cooling system to require attention, the plant's maintenance needs are reduced to an absolute minimum. The modern design of the plant, with its close coupled engine and generator, makes it an extremely compact unit, saving on installation space.

★ ★ ★

This new plant provides an ideal combination of low initial and minimum operating expense. It can be furnished for single phase or three phase service, at either standard or special voltages. Complete information and specifications may be had by writing the Universal Motor Company, 494 Universal Drive, Oshkosh, Wisconsin. Ask for bulletin DHE-1.

Becomes Division of Associated Spring

The Seaboard Coil Spring Corp., Los Angeles, has become a division of **Associated Spring Corp.**, Bristol, Conn. Seaboard manufactures a wide variety of precision mechanical springs and wire forms.

Motodrive With Conoflow Control

Reeves Pulley Company, Columbus, Indiana, pioneers in the field of Variable Speed Drives and Controls, announces the addition of the Conoflow Control to its present line of automatic controls available.

★ ★ ★

The Conoflow Control is available on all integral horsepower Reeves Vari-Speed Motodrives for use in conjunction with instrumentation air pressure of 3—15 PSI. The integral horse power Reeves Vari-Speed Motodrives with the new Conoflow Control have 6 to 1 maximum speed ranges on all units with capacities to 25 HP.

★ ★ ★

The present hydraulic and pneumatic controls still are available on the Reeves Vari-Speed Motodrives in addition to the new Conoflow cylinder.

★ ★ ★

Addition of the Conoflow Control permits the Reeves Vari-Speed Motodrives to control liquid levels in tanks, whether of the open or enclosed types. In addition, the Conoflow Control makes it possible to use the Motodrive for automatically controlling flow proportioning systems of liquid, gas, chemicals, etc., as well as pressure and temperature.

★ ★ ★

Connection is made direct to the Conoflow Cylinder on the Reeves Drive from a pneumatic controller.

★ ★ ★

The Conoflow Cylinder is prelubricated and no outside lubrication is necessary. This type Control may be operated from the present air supply in a plant, and it can easily be connected to any pneuma-

PITTSBURGH, STEEL CAPITAL OF THE WORLD,

IS ENJOYING TREMENDOUS GROWTH. SHOWN HERE IS PITTSBURGH'S GOLDEN TRIANGLE OF THE FUTURE

KEEPING PACE WITH PITTSBURGH'S PROGRESS IS THE PARKIN CHEMICAL COMPANY. PRODUCING BETTER ACID INHIBITORS, PICKLING COMPOUNDS, AND ACCELERATORS FOR STEEL PICKLING, THE PARKIN CHEMICAL COMPANY IS SERVING THE STEEL CAPITAL AND THE REST OF THE NATION'S STEEL MILLS. WE PRODUCE THE RIGHT COMBINATION FOR LOW COST PICKLING OF STEEL.

REMEMBER THOSE PERFECT PARTNERS FOR PICKLING

NEP INHIBITOR AND SUMFOAM COMPOUND

We Solicit Your Inquiries.

parkin CHEMICAL COMPANY

Highland Bldg. • MOntrose 1-0176

PITTSBURGH 6, PENNA.

PICKLING SPECIALISTS

Parkin of Pittsburgh

IN STEEL SINCE 1860

tic control instrument.

★ ★ ★

Units are now available, with prompt shipments being made. For additional details, write Reeves Pulley Company, Columbus, Indiana.

Folder on Annealing Furnaces

The Lee Wilson Engineering Company, 20005 West Lake Road, Cleveland, Ohio, has issued a new eight-page bulletin on wire annealing furnaces. In it are illustrated a series of installations that is described as "a record of performance and a promise for the future". They will be glad to send this fine bulletin to persons who may request it.

New Universal Coupling Announced

A new type of universal coupling, operating on the ball and socket principle is available for all types of machinery requiring coupled shafts, either at an angle or straight line.

★ ★ ★

The unit features simplified construction with a reduced number of working parts. The essentials of the unit consist of a ball, fitting into a socket with the stress of power transmission absorbed by two oversize keys. The entire assembly is held in place by a rolled and crimped cap. Bearing surfaces are heat treated and machined to close tolerances.

★ ★ ★

A reservoir in the base of the socket retains lubricant for slow feeding to points of wear.

★ ★ ★

The absence of the customary block and pins provides a small unit in relation to the size shaft it will turn. It has a maximum deflection of 30 degrees and is as strong as the shaft it is bored to receive. It is particularly effective at medium and high speeds.

★ ★ ★

The coupling lends itself well to all types of machinery, both new and for maintenance replacement in machinery in service.

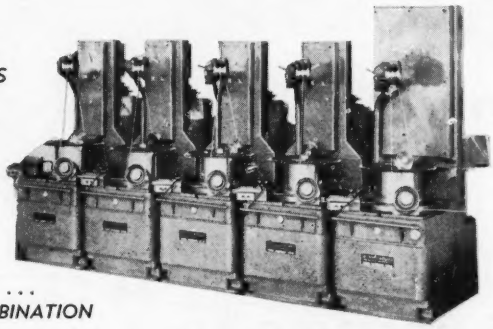
★ ★ ★

Full details are supplied in the manufacturers bulletin #185 issued by the **B. M. Root Co.,** York, Pa.

AETNA-STANDARD WIRE DRAWING UNIT

- DESIGNED FOR COMPLETE VERSATILITY
- BUILT FOR SAFE, EFFICIENT PRODUCTION
- SINGLE OR MULTI-DRAFT OPERATION
- INTERCHANGEABLE UNITS AND PARTS
- AUTO-RHEOSTATIC SYNCHRONIZATION
- WATER COOLED BLOCKS AND DIES

FERROUS OR NON-FERROUS



WET OR DRY LUBRICANTS

SINGLE UNIT ... OR ANY COMBINATION

THE AETNA-STANDARD ENGINEERING CO.
PITTSBURGH, PA.

ASSOCIATED COMPANIES: HEAD, WRIGHTSON & COMPANY, LTD., THORNABY-ON-TEES, ENGLAND
AETNA-STANDARD ENGINEERING COMPANY, LTD. . . . . TORONTO, ONTARIO, CANADA

NORBIDE® Abrasive: *Effective, Economical*

NORBIDE Abrasive, made of Norton Boron Carbide, is second only to the diamond in hardness — *but 150 times less expensive!* It will effectively cut and semi-finish wire drawing dies, particularly those made of the hard cemented carbides.

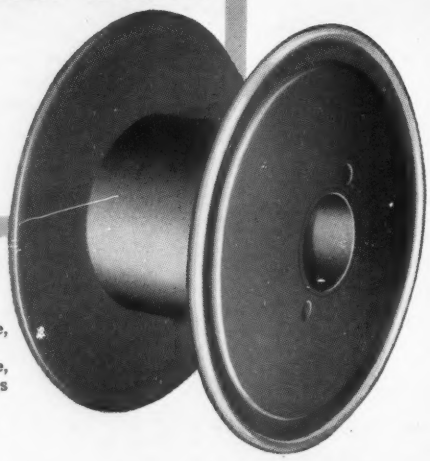
Write for Catalog No. 559-W

NORTON COMPANY
Worcester 6, Mass.

NORTON *Making better products to make other products better*

What's your problem with...

SPOOLS
REELS
BOBBINS?



Get in touch with Apco Mossberg. We are familiar with the production problems involving steel spools, reels and bobbins, utilized in the copper wire, steel wire and wire rope industries. Profit from our half-century of experience, engineering know-how and plant facilities —making possible the manufacture of almost any conceivable kind, type, size and quantity of steel spools, reels and bobbins. Contact us for free engineering service. Without obligation we will be glad to offer suggestions and solutions to your particular problems.

Write TODAY for a copy of our booklet that illustrates:

- *Flat Head Spools*
- *Curled Flange Spools*
- *Stranding Reels*
- *Take off Reels*
- *High Speed Wire Drawing Reels*
- *Vulcanizing and Insulating Reels*
- *Pressed Steel Bobbins for Wire Weaving*

APCO MOSSBERG CO.
(The original Frank Mossberg Co.)
Attleboro, Mass., U.S.A.

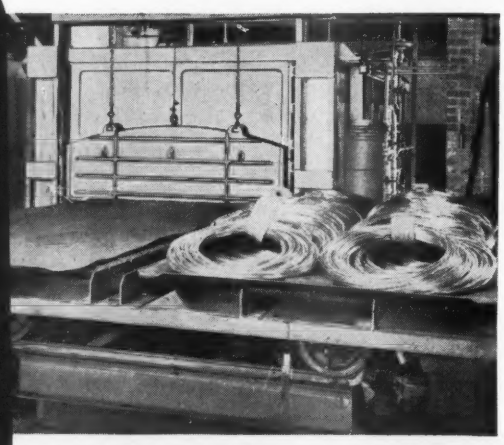
Pacific Coast Representative
Gordon Proffitt
Matson Building
215 Market Street
San Francisco, California

Canadian Representative
Hugh P. Williams & Co.
47 Colborne Street, West
Toronto, Ontario, Canada

ROCKWELL FURNACES
for Annealing Hardening · Drawing · Normalizing Galvanizing and Tinning

Batch or Continuous · Oil, Gas or Electric

Direct Heated Muffle Type Radiant Tube Atmospheres



Gas-fired pan type furnace for annealing 5000 lbs. of medium gauge brass wire; furnace atmosphere controlled to produce oxide-free wire — in many cases practically bright. Other Rockwell furnace types include parallel tube, belt conveyor, pit, hood and others.

ROCKWELL SINCE 1888 BUILT

FURNACES · OVENS · SPECIAL MACHINERY
W. S. ROCKWELL COMPANY
242 ELIOT STREET · FAIRFIELD, CONN.
In Canada: Francis Hankin & Co., Ltd. Montreal & Toronto

Liquid Rust Inhibitor for Wet Blasting Machines

American Wheelabrator & Equipment Corporation, 1114 South Byrkit Street, Mishawaka, Indiana, announces that Anarust, a liquid rust inhibitor for wet blasting machines, is available from stock.

★ ★ ★

Anarust is a material of organic composition, and it contains no chromates. It is completely soluble in hard or soft water at 20 degrees Centrigrade, and it produces a clear colorless solution, which is odorless, non-irritating to the skin, and not subject to bacterial decomposition. It produces no foaming when put into solution, and keeps water staining to a minimum on ferrous parts which are rinsed in it. Its specific gravity is about 1.0 at 20 degrees Centrigrade.

★ ★ ★

When used at the rate of approximately ½ ounce per gallon of water, it is a very effective agent in retarding rusting on cast iron or steel parts which are being cleaned and washed after wet blasting. It can also be safely used on parts prior to undergoing such operations as plating, enameling, painting, etc.

★ ★ ★

Anarust is available from the manufacturer in five-gallon cans.

New Holland Metals Bought by Executives

The Quaker State Metals Company has purchased all the manufacturing facilities and business of the New Holland Metals Company, Mountville, Pa. The new company will continue operations at Mountville manufacturing and selling aluminum roofing sheets, industrial roofing sheets, guttering and downspouting, moulding, shapes, and building accessories. Quaker State expects to expand its production to include the manufacture of other aluminum products, as well as some steel and copper products.

★ ★ ★

Quaker State Metals, an independently owned corporation, will be directed by the same group of executives who guided the operations of the old New Holland Metals Company.

★ ★ ★

Heading up the executive staff as President of Quaker State Metals is **R. D. Buckwalter**, whose association as Executive Vice President of New Holland Machine Company has made him well known in the implement trade.

★ ★ ★

Vice President and General Manager of Quaker State Metals is **W. G. Hume**, who as General Sales Manager of several large steel concerns is well known in the wire products business, and for 34 years a familiar figure in the steel business and known to jobbers and dealers of building products throughout the country. He has been in the aluminum field for the past seven years.

★ ★ ★

A third key member of Quaker State Metals' executive staff is **A. H. Charlton**, who is Vice President in charge of sales. Mr. Charlton has been in the aluminum industry for many years, having held several regional mangerships for Reynolds Metals Company, and having been national Sales Manager for Reynolds' Aluminum Division. He is well known to users and distributors of aluminum.

★ ★ ★

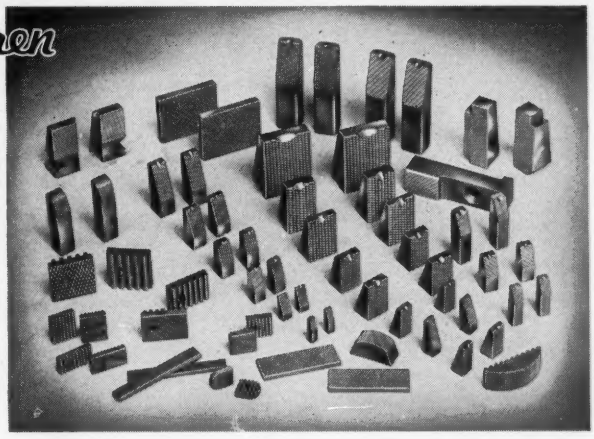
While Quaker State Metals is a new name in the aluminum manufacturing industry, the staff and productive organization of the company are far from "new" to their work. The experience and background of the executive staff speaks for itself. The company now operating as Quaker State Metals Company is no newcomer to the aluminum manufacturing industry, either. It was formed from the New Holland Metals Company, Division of New Holland Machine Company, both subsidiaries of the parent Sperry Corporation, New York. The New Holland Metals Company, now Quaker State Metals Company, started in business in January of 1947. Their five and a half years of growth now make Quaker State Metals one of the largest fabricators of aluminum building products in the country.

Catalog of Specialty Wires

Electric Wire Company, Inc., 122 Federal Street, Northampton, Mass., has very recently published a new catalog descriptive of various wires manufactured by them with a list of

Sjogren

JAWS.... for Wedge Grips, Pullers and Tensile Testing Machines of all makes are available either from stock or manufactured to order. A Sjogren jaw, made to meet your requirements, guarantees you service.



Our Silver 25 1927-1952 Anniversary Year

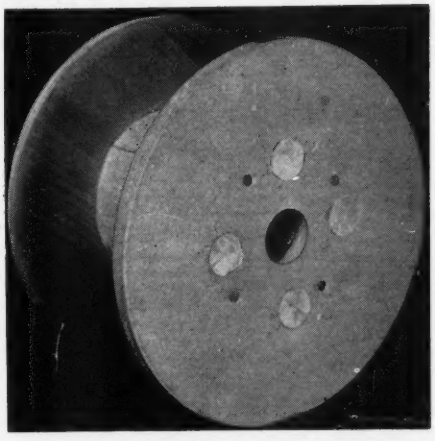
SJOGREN TOOL AND MACHINE CO., INC.

WIRE PULLERS • WEDGE GRIPS • JAWS FOR ALL MAKES OF PULLERS AND TESTING MACHINES • CAGE ROLLERS • SWAGING HAMMERS • POINTING DIES • WIRE SPOOLERS

14 SWORD STREET AUBURN MASSACHUSETTS

Represented in Canada by THE LARSON CO., 98 Wellington St., West, Toronto, Ont.

FINE PLYWOOD REELS FOR WIRE



Made of kiln dried wood, all parts secured with dowel pins, making the reel *all wood* in construction. These are the famous dowel constructed reels originated by WINCHESTER.

Accurately fitted dovetail joints result in reels that are extremely rigid and strong. No joints to open up.

Made in diameters of 6" to 48", returnable and non-returnable.

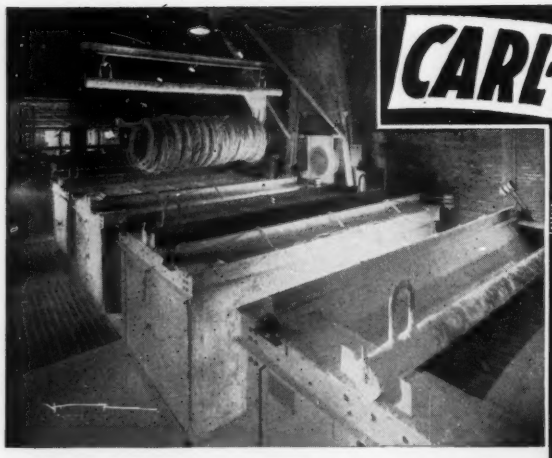
Shipped to any point in New England by truck.

Get the facts today on these fine reels

WINCHESTER REEL COMPANY, Inc.

ASHUELOT, N. H. TEL.: WINCHESTER 163-2

Our Products Carry Reel Loads.



CARL-MAYER

HI-SPEED REGISTERED

ROD BAKERS

PATENT Nos. U.S.A. 2,235,559 2,296,361 2,323,828 CANADA 396,144 401,589

ALSO OTHER TYPES OF INDUSTRIAL OVENS AND FURNACES

GREATER SPEED AND FUEL ECONOMY PROVES OUTSTANDING ENGINEERING

Carl-Mayer Hi-Speed Rod Bakers have an exclusive heating arrangement, combining faster baking with amazing fuel economy — and a patented Blow-Off feature which removes moisture without bumping or agitating the coils. *WRITE FOR BULLETIN NO. 350.*

SERVING CONCERNS LIKE THESE:

American Steel & Wire Co.
Atlantic Wire Co.
Atlas Steel Co.
Atlas Tack Corp.
Babcock & Wilcox
Canadian Steel Corporation.
California Wire Cloth Corp.
Colorado Fuel & Iron Corp.
Crucible Steel Co. of America.
Eaton Manufacturing Co.
Frost Steel & Wire Co., Ltd.
B. Greening Wire Co., Ltd.
Gary Screw & Bolt Division of Pittsburgh Screw & Bolt Corp.
Hollup Corp.
Indiana Steel & Wire Co.
Johnson & Nephew, Ltd.
Jones & Laughlin Steel Corp.
Page Steel & Wire Co.
Pittsburgh Tool Steel Wire Co.
Republic Steel Corp.
Steel Co. of Canada

THE CARL-MAYER CORPORATION

3030 EUCLID AVENUE
CLEVELAND, OHIO

WIRE DRAWING

FROM .0403" TO .005" (Not Annealed)

FERROUS and NON-FERROUS WIRES

SPECIALISTS IN:

- **WIRE STRANDING**
- **BUNCHING**
- **SPOOLING**
- **BRAIDING**

Please write to

BUY WITH CONFIDENCE ANCHOR QUALITY

ANCHOR WIRE CORPORATION
183-16 JAMAICA AVE.
JAMAICA 3, LONG ISLAND, NEW YORK

suggested uses for each and their compositions and properties.

★ ★ ★

The metals drawn into wire by them include aluminum, beryllium copper, copper, brasses (all grades), phosphor bronze, iconel, monel, nickel silver, silver and stainless steel.

★ ★ ★

Such wires are used for innumerable purposes, from electrical conductors to jewelry; from pins of various sorts to chains; from insect screening to fourdrinier wire cloth; from scratch brushes to springs; etc.

★ ★ ★

One of the notable features of Electric Wire's service to its customers is its ability to deliver wire exactly as specified, with no variations for permissible tolerance. While all types of end uses may not require such exacting drawing methods, there are many places in which a rigid adherence to the wire size specified is highly essential.

★ ★ ★

A copy of this catalog will be mailed by the Electric Wire Company upon requests from interested persons or concerns.

New Process Reclaims Bigger Percentage of Diamonds From Waste Material

A new electro-chemical process, developed by the **Diamond Dust Company,** reclaims all types of diamond containing material. Any plant that has used or broken diamond impregnated grinding wheels, saws, drill bits, tools, sludge or swarf from grinding operations, contaminated diamond powder, lapping cloths smeared with diamond dust from lapping operations can take advantage of this highly efficient diamond reclaiming service.

★ ★ ★

With reference to sludge or swarf it is recommended that you send a two pound sample for free analysis. You will then be advised of its value. You have a choice of either receiving payment or requesting that the reclaimed diamond powder be returned to you. In the latter case there is a nominal fee.

★ ★ ★

For an interesting folder write the Diamond Dust Co., 15 W. 44th St., New York 36, N. Y.

★ ★ ★

Personalities

(*Continued from page* 1310)

John E. Timberlake Takes Post With NPA

Appointment of **John E. Timberlake,** of Pittsburgh, Pa., as director of the **Iron and Steel Division,** was announced in October by R. A. McDonald, Administrator, National Production Authority.

★ ★ ★

Mr. Timberlake succeeds M. B. McCafferty, who was on loan to NPA from Wheeling Steel Corporation from March 1, 1951 until October 1, 1952, having served in various capacities with the division prior to returning to his Corporation. Mr. Timberlake, general manager of sales for the Jones & Laughlin Steel Corporation, was appointed deputy director of the Iron and Steel Division on July 1, 1952.

★ ★ ★

He was born in 1904 in St. Louis, Mo. He attended Washington University in St. Louis, and later matriculated at Carnegie Tech in Pittsburgh. He has had no previous Government experience.

R. H. Stroth Made District Manager By Chase Brass & Copper

Ralph H. Stroth, who has been with **Chase Brass & Copper Company, Incorporated,** a division of Kennecott Copper Corporation, since 1926, has been appointed Indianapolis district manager of Chase effective November 1st, it was announced by W. C. Gram, central regional manager. In this capacity he will have charge of sales in the Indianapolis Territory, comprising most of Indiana, and will supervise the Chase Indianapolis warehouse at Indianapolis.

★ ★ ★

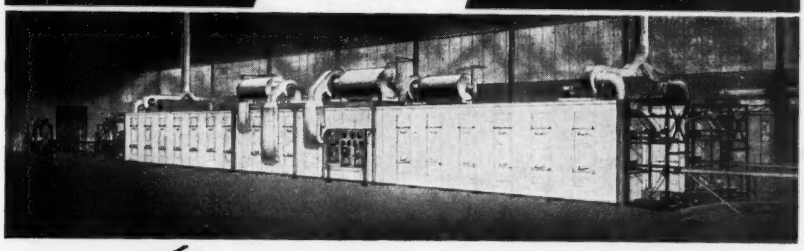
Mr. Stroth has served continuously with Chase since he joined the sales force at the Chase Cleveland warehouse in 1926. From August 30, 1944, to November 1, 1952, he was assistant Cincinnati district manager.

★ ★ ★

He succeeds **Vincent Meyer,** who has been appointed to the Chicago district sales office where he will handle large industrial accounts. Mr. Meyer started with Chase in 1926, and had been district manager at Indianapolis since 1945.

CARL-MAYER WELDING ROD OVENS

PATENT NOS. 1,843,430 2,373,325



One of Several Carl-Mayer Ovens at Hollup Corp.

FAST, EFFICIENT AND ECONOMICAL DRYING OF COATED WELDING RODS.

Only in Carl-Mayer Ovens can you obtain the combination of the recirculating gas fired air heater principle and the "Mayer" patented rod transfer system — two highly important features in ovens of this type.

We also build other types of industrial ovens and furnaces. Carl-Mayer installations are backed by reputation for unusual performance, and over 30 years' experience.

WRITE FOR BULLETIN NO. 350

THE CARL-MAYER CORPORATION

3030 EUCLID AVENUE
CLEVELAND, OHIO

VINYLS for . . .

CRITICAL CUSTOMERS

For the past ten years we have specialized in the compounding of Vinyl extrusion and injection molding compounds to specifications, or developing compounds for a specific end use.

Underwriters' approved standard compounds are available in all colors for POT, T, TW, 80 Degree C, 90 Degree C and 105 Degree C wires.

Save your plant space for wire processing equipment. Let us tailor your compounds to bring out the special properties you require.

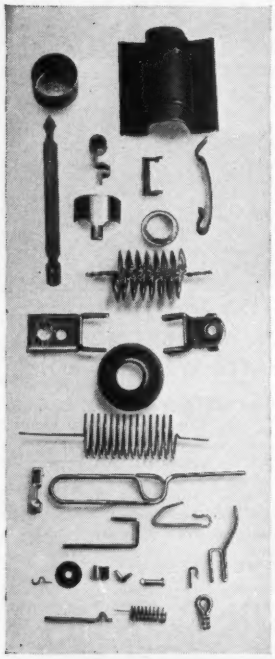
Your inquiries are invited.

ELECTRONIC RUBBER COMPANY

69 Sunnyside Ave. • Stamford, Conn.

Priced Right!

WIRE FORMS & Metal Stampings



High-speed, quality production with custom-made precision. Wire formed in any shape for every need.

IMMEDIATE CAPACITY FOR DEFENSE SUB-CONTRACTS

STRAIGHTENING & CUTTING
Perfect straight lengths to 12 ft.
.0015 to .125 diameter

WIRE FORMS
.0015 to .080 diameter

SMALL METAL STAMPINGS
.0025 to .035 thickness
.062 to 3 inches wide

Specializing in Production of Parts for Electronic and Cathode Ray Tubes

Write for illustrated folder.
Send Blueprints or Samples for Estimate.

ART WIRE and STAMPING COMPANY
4-A BOYDEN PLACE
NEWARK 2, N. J.

SAVE MONEY WITH A NEW MORRISON FLASH BAKER

Mr. John R. Morrison, who originated and has built most of the Flash Bakers now in use, announces a new, improved, low cost Baker with these important features:

MORE COMPACT—requires only small pit below floor level.

FASTER BAKING—due to increased air velocity and reduction in waste space in baking chamber.

LESS MAINTENANCE—new ram-jet type burner equipment replaces old style brick combustion chamber with its inherent, troublesome failures.

GAS OR OIL FIRED—use either fuel instantly.

SHIPPED COMPLETELY ASSEMBLED—low installation costs.

All of which add up to a more efficient Flash Baker—at low cost.

Write for complete specifications.

MORRISON INDUSTRIES, INC.
engineers & builders of industrial process equipment
furnaces • ovens • dryers • washers • pickling and plating machines • material handling systems • wire mill equipment • special production equipment
17100 MILES AVE • CLEVELAND 28, OHIO

Chase Appoints District Representatives

Arthur F. Norling has been appointed sales representative for the Cincinnati district, **Chase Brass & Copper Co., Inc., William J. Weir** has been made sales manager of wholesale accounts; and **Arthur C. Hoey** has been named sales representative in the Cleveland district.

Placed in Charge of Design

John L. Myers has been appointed products engineering manager in charge of design by **National Electric Products Corp.**, Pittsburgh, Pa.

Celebrates 50th Year With Armco

Celebrating the anniversary of his 50th year with **Armco, Charles R. Hook,** Board Chairman, was honored on October 27th at a banquet given by more than 600 of his coworkers.

★ ★ ★

Men from 55 Armco steel and fabricating plants in the U. S. and Canada came to Middletown for the occasion. Plant managers, officers of unions and other employee representatives, officers of veteran's clubs and Armco associations, and directors of the company took part.

★ ★ ★

This was the first time that men from all Armco plants had met together in Middletown.

★ ★ ★

Fifty-year men from all Armco divisions were special guests at the dinner, and they presented Mr. Hook with a working model of the now-obsolete sheet steel rolling mill. This hand mill was standard equipment in the steel industry when he started with Armco 50 years ago.

★ ★ ★

In his half century with the company, Mr. Hook has seen Armco develop the continuous rolling method which has contributed so much to steel making progress.

★ ★ ★

Mr. Hook started with Armco when it had only 325 employees and has seen it grow into a world-wide organization employing 30,000 men and women.

Appointed to Executive Post by Hydropress

Emery B. Kerekes was named assistant to the vice-president of **Hy-**

BUNCHING
(TWISTING)
AND
STRANDING
IN THE WIRE AND
GENERAL MANUFACTURING
PROCESSES

SPECIALIZED
ENGINEERING
AND
SPECIALIZED
FACILITIES
AT YOUR SERVICE

Expanding application of twisting principles to the production of many products is reflected by an ever-increasing demand for both H-D standard equipment as well as machines especially engineered to solve varied production problems. Week after week surprising new uses are developed through the close cooperation of our engineering department with manufacturers in many fields.

Write today for our New Technical Bulletins. Tell us what you make—or contemplate making and your inquiry will receive prompt attention.

HASKELL-DAWES
MACHINE CO., INC.
2231 E. ONTARIO ST.
PHILADELPHIA 34
PA.

dropress, Inc. and its subsidiary, **The Loewy Construction Company, Inc.** of New York, builders of heavy hydraulic machinery and rolling mills.

★ ★ ★

Mr. Kerekes who has long been associated with leading U.S.A. industrial concerns in management, development engineering, and plant operation, is a mechanical engineer and a member of A.S.M.E., S.A.E. and N.J.S.P.E.

Armco Chairman on Economic Mission for Government

Charles R. Hook, Armco chairman, has been appointed by Secretary of Commerce Charles Sawyer as a member of a government economic mission to study industrial problems in several European countries.

★ ★ ★

Mr. Hook is one of two businessmen selected by Secretary Sawyer to serve on the mission. The remainder of the sixteen man mission is composed of government representatives. The mission is directed to investigate the impediments upon private investments abroad and report to the Mutual Security Agency.

★ ★ ★

Mr. Hook, though a Republican, was selected because Armco Steel Corporation has for many years conducted extensive operations in Europe and he is familiar with economic conditions there. In addition, he has been an active member of the Business Advisory Council since its organization almost 20 years ago. The Council advises the Secretary of Commerce on problems affecting business. The mission left on October 31st.

Hooker Appoints Western Manager

Thomas E. Moffitt has been appointed western manager of the **Hooker Electro-chemical Company,** it was announced recently by Bjarne Klaussen and R. W. Hooker, executive vice president and vice president in charge of sales, respectively. **Horace W. Hooker, Jr.,** has been appointed western sales manager, succeeding Albert H. Hooker who has taken an extended leave of absence on the advice of his physician.

★ ★ ★

Get Extra Production Without Extra Man-hours... Use
BORAX

● If you're using a lime bath or other compounds for steel wire-stock surface protection, change over to BORAX! This safe, clean, easy-to-handle material is practically dust-free. BORAX, readily soluble in water at working temperature... (190°-200°) eliminates the need for bath solution agitation. Just ONE DIP, which dries quickly in a few minutes, gives an adequate, non-flaking, protective film to rods and wire. This tight, pliable, film of BORAX allows your operator to feed at much faster speeds because of its great affinity for soap lubricants... yet you get longer and more accurate performance from your dies! The film remains on the finished wire as a rust-resistant and is a natural flux. Yes, BORAX has *all* the advantages; use it to get *extra* production!

Here Are The Advantages of Borax-Coated Stock:

- Compatible with drawing lubricant.
- Cleaner to handle in transit.
- Remains in better condition... *an adequate supply can be stored for weeks without reconditioning.*
- No cleaning of ends necessary before electric butt welding.
- Rust inhibited... no oxide film forms.
- Can be cleaned most easily.

WRITE FOR FULL INFORMATION

PACIFIC COAST BORAX CO.
DIVISION OF BORAX CONSOLIDATED, LIMITED
NEW YORK • CHICAGO
LOS ANGELES • CLEVELAND
PHILADELPHIA

MANUFACTURERS OF FAMOUS 20 MULE TEAM PACKAGE PRODUCTS

7 out of 9

WIRE MILLS

that Liquor Finish Wire

use

STANNOUS SULFATE

because

Tin Losses Are Reduced . . .

by elimination of high tin sludging due to incomplete reaction in feather tin method.

Results Easier to Control . . .

only two variables to watch — Stannous Sulphate and Copper Sulphate — allows immediate, simple color adjustment.

Every Batch the Same . . .

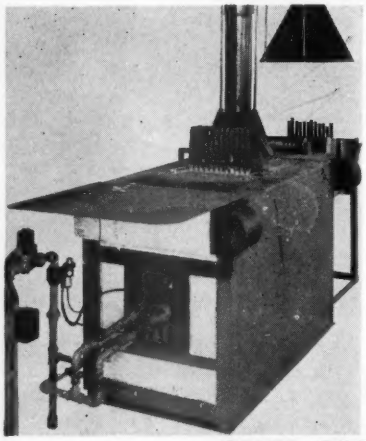
M&T Stannous Sulphate method produces smooth, uniform wire coatings, unvarying from lot to lot.

See how use of M&T Stannous Sulphate can help you save tin in liquor finishing. Write for engineering data.

METAL & THERMIT CORPORATION
Chemical Division
100 E. 42nd St., New York 17, N. Y.
Specialists in Tin and Tin Chemicals

12-Head High Speed Tinner

PAY-OFF • FLUX POT • TIN POT • TAKE-UP



HOT TINNING SPEEDS
UP TO
900 FT. PER MIN.

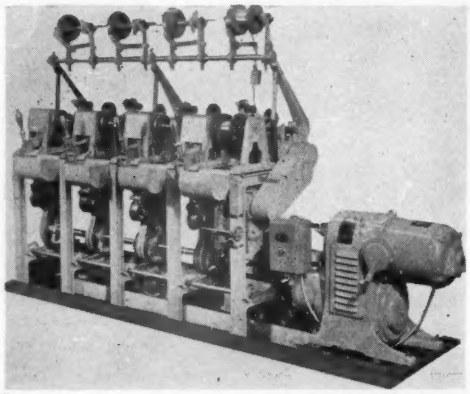
HANDLES WIRE
FROM B. & S. No. 24
THRU B. & S. No. 36

Efficient • Dependable

OTHER COOK EQUIPMENT

- Wire Drawing machines
- Bunchers
- Twisters
- Wire String-Up machines.
- Enameling Take-Ups and Pay-Offs
- Enameling machines
- Cabling machines
- Spoolers
- Tinning Take-Ups and Pay-Offs
- Tinning Pots
- Wrapping machines
- Special machinery

COOK MANUFACTURING COMPANY
265 NORTH 9TH STREET **PATERSON 2, N. J.**



1900-HV MULTIPLE SPINDLE SPOOLER

SPECIFICATIONS
Size Range: .010" to .080" or heavier if soft and many flat wire sizes.
Max. Spool Size: 16" flange diameter.
Capacity: usually 4 to 8 spindles.

The 1900-HV Spooler is a rigid, precision machine which will consistently produce a uniform, dense wire lay. Both the traverse and spindle drives are regulated through wide-range, stepless, variable speed units, eliminating change gears. The 1900-HV is completely adaptable to your particular constant or changing demands. All controls are positive. Adjustments are made accurately with the spooler in operation and without tools.

Both smooth acceleration and rapid stopping is obtained through a single lever at each station. Spool changing is simple and rapid. Anti-friction bearings are used on all shafting and spindles.

Your special requirements can be incorporated into the design. Each machine is delivered ready for operation from your power supply.
Payoff stands furnished as extras.

Consult us on your spooling problems.

ROBERT J. EMORY COMPANY
31 East Runyon Street Newark 5, N. J.

A NAME YOU CAN DEPEND ON!

In these days of highly complex cable coating requirements, a dependable source of supply is important!

That's why more and more U. S. wire manufacturers are turning to the firm that specializes in producing lacquers for the insulated wire industry—the New England Lacquer Company.

Our technical specialists are ready to work with you at any time—to help solve *your* lacquer problems. Write for details!

The above photograph is one of many contained in an eight-page brochure describing our facilities to serve you. Write for your copy of the complete brochure!

NEW ENGLAND LACQUER CO.
150 KING PHILIP ROAD
EAST PROVIDENCE, R. I.

Mr. Moffitt's appointment makes him senior executive for all Hooker affairs in the west coast area, including British Columbia. He has been works manager of the Tacoma Plant since October 1951, and previously had served as assistant works manager, assistant sales manager, and as a chemical engineer. Mr. Moffitt originally joined Hooker in 1930 and served until 1945. He rejoined the organization in 1950.

★ ★ ★

Horace W. Hooker, Jr., has been associated with the organization since 1934 when he joined the research and development department. In 1940 he had charge of advertising and sales promotion. He was made assistant purchasing agent in 1941 and was appointed general purchasing agent in 1947.

W. E. Bown

William Edmund Bown, 50, vice president, **Dominion Steel & Coal Corporation, Ltd.,** died on October 27th at the Montreal General Hospital.

★ ★ ★

Mr. Bown joined the Dominion Steel & Coal Corporation in 1917. He became general manager, Canadian Tube & Steel Products Ltd., in 1943, and in 1948 was appointed to the position he held at the time of his death.

★ ★ ★

Born in Sydney, N. S., he received his primary and high school education there.

★ ★ ★

He attended Acadia University and received his B. Sc. from McGill University in 1923.

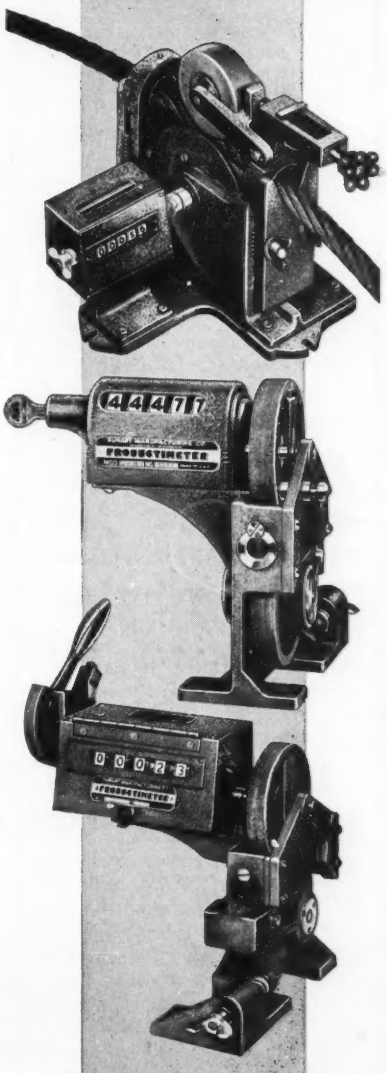
To Handle Sales for Catalytic Combustion Corporation

The appointment of **Paul H. Goodell** as Sales Manager of the **Catalytic Combustion Corporation,** Detroit, Michigan, is announced by R. J. Ruff, President.

★ ★ ★

Mr. Goodell has been prominently identified in the field of industrial heating for the past 15 years. He was formerly associated with Jensen Specialties, Inc. and the Trumbull Electric Department of the General Electric Co. He is now Chairman of the Electric Heating Committee of the American Institute

PRODUCTIMETER
WIRE MEASURING MACHINES
Fast . . Accurate . . Dependable . . Legible



Productimeters measure all types of wire from .010 to 1½ inches in diameter . . . at speeds up to 5,000 feet per minute. They eliminate "guess-work". . . insure profitable operation in your plant.

Send for Catalog No. 40

DURANT MFG. CO.
1918 N. Buffum St. Milwaukee 1, Wis.
118 Orange St. Providence 3, R. I.
Representatives in Principal Cities

PRODUCTIMETERS
SINCE 1879 *Count Everything*

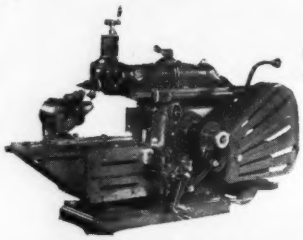
DYKREX

Special

7"

SHAPER

With Special Geometric Head



Makes Shaped Laps Faster and Better

Now You Can Use Regular Die Room Workers To Make Better, Low Cost Precision Shaped Laps

Here again, DYKREX engineers have taken a machine with a special geometric tilting head and adapted it to a standard table type shaper in order to produce faster, more accurate and better shaped die laps. No matter what angle, what type or how many sides are needed on your shaped die laps, you can make them easily on the DYKREX Atlas Shaper. The bed of the shaper has been extended and steel adapting plate is attached to which geometric head has been installed. You can purchase the fully equipped machine which includes 1/3 HP, 110/220 Volt, 60 Cycle, single phase motor or any of the parts to be attached to your own shaper.

DYKREX
"IT CORRECTS THE DIE"

Write for Full Information

DYKREX CORPORATION OF AMERICA
33-35 Bloomfield Ave., Newark 4, N.J.

of Electrical Engineers, and a member of the Ovens and Furnaces Committee of the National Fire Protection Association.

★ ★ ★

Mr. Goodell is also a Fellow in the Illuminating Engineering Society, a registered electrical engineer, and a member of the National Society of Professional Engineers.

★ ★ ★

In his new capacity, Mr. Goodell with a select group of field engineers will be assisting industrial plants in the application of the Catalytic Combustion Process for low-temperature fume combustion. Concurrent with this staff expansion, Catalytic Combustion Corporation is also enlarging its development program on employment of catalysis for Air Pollution Control and heat recovery from industrial waste gases.

Joins Atlas Mineral Products

Martin H. Smith, formerly of Hercules Powder Company, has joined the Technical Service Department of the **Atlas Mineral Products Company.**

W. Howard Barney

W. Howard Barney of 133 Twin Oaks Drive, Warwick, former vice president and general manager of the **Collyer Insulated Wire Co.** of Pawtucket and its branches at Central Falls and East Providence, died on September 16th at his home after a long illness.

★ ★ ★

Mr. Barney retired from his position with Collyer in 1949 after 25 years of service. Before that he was with the Bourne Rubber Co. of Providence as general manager.

★ ★ ★

William J. Secor, Sr.

William J. Secor, Sr., 68, General Superintendent of **Waterbury Farrel Foundry & Machine Co.**, and a member of its Board of Directors for the past two years, died on the morning of September 11, after a short illness.

★ ★ ★

Mr. Secor, who was born May 2, 1884 in Austria, came to this country at the age of nine months. After attending Derby High School and Sheffield Scientific School of Yale

S. A. ETECO

ZWEVEGEM
(BELGIUM)

Selling Office for
Tréfileries León Bekaert, S.P.R.L.

STEEL WIRES

IF YOU REQUIRE

NO CMP REQUIRED

Submit your SPECIFICATIONS To The REPRESENTATIVES:

J. GERBER & CO., INC.

855 Avenue of Americas
NEW YORK 1, N. Y.

University, he worked for the General Electric Company in Schenectady, N. Y., for some years.

★ ★ ★

On May 30, 1910 he came to work for Waterbury Farrel Foundry & Machine Company rising from the ranks in the Engineering Department's drafting room to the position of assistant plant production superintendent in 1920 and general superintendent of the firm in 1926. Two years ago he was named a member of the Board of Directors.

Howard E. Waddington

Howard E. Waddington, construction engineer at the Universal-Cyclops Steel Corporation for more than 25 years, died at his home in Bridgeville on Sept. 1st. He was 72. Mr. Waddington, well-known in the Pittsburgh district steel industry, had been ill since last May. He retired from Universal-Cyclops in 1948, when he was one of the oldest employes of the plant in years of service.

Spring Man Serving Controllers Institute

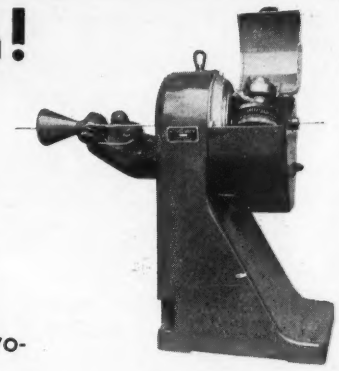
Donavan J. Gray, comptroller of the **L. A. Young Spring and Wire Corporation,** Detroit, is chairman of the publicity committee for the 21st Annual Meeting of the Controllers Institute, to be held October 5-8 in the Sheraton-Cadillac Hotel, Detroit.

Bristol Publishes New Tachometer Bulletin

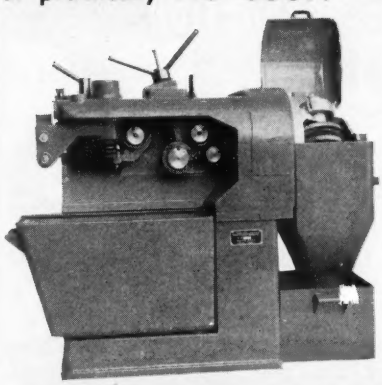
A new bulletin describing its full line of recording and indicating electric tachometers has just been published by **The Bristol Company,** Waterbury, Conn. The instruments described include models for measuring speed of rotation or travel, processing time, speed ratios, sum or difference of speeds, and average of speeds. Featured in the bulletin are the recently-announced electronic Dynamaster Recording Tachometers. Engineering information and complete specifications on magnetos and the various types of magneto drives are given. The 20-page bulletin, No. S1402 is liberally illustrated with photos and drawings showing methods of application, reproductions of actual chart records, and dimensions. Copies of the bul-

TRY—one or both!

LINÉ-GORCY MECHANICAL WIRE ROD DESCALERS



YOU can TEST these remarkable two-stage descalers in YOUR MILL at practically NO COST!——BECAUSE they do PAY for themselves in the dry descaling of the first FEW hundred tons of YOUR RODS!



FISHER ASSOCIATES

SOLE AMERICAN DISTRIBUTORS

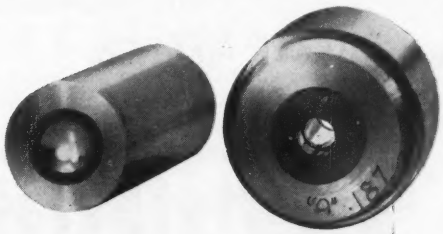
Suite 1119—Chanin Building
122 East 42nd Street
New York 17, N. Y.

Telephone: MUrray Hill 5-1937

SAVE

MAN HOURS DIAMONDS AND TUNGSTEN-CARBIDE with HYPREZ "OS" DIAMOND COMPOUNDS

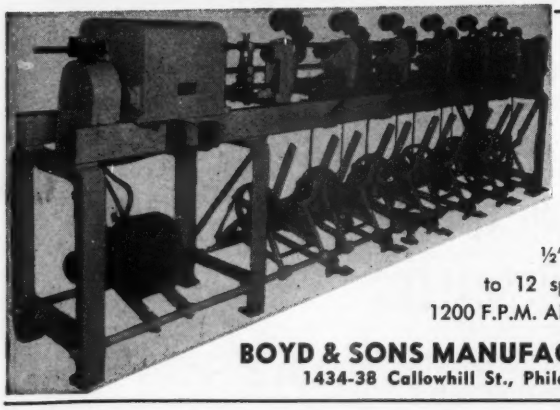
- Hyprez "OS" is self-lubricating, will not fly off work or tool, absorbs more abraded material—has long-lasting cutting action.
- "OS" diamond particles are precision graded, uniformly distributed, permanently suspended.
- "OS", like "Type W", is available in color-identified 18 or 5 gram cartridges for Hyprez Applicator Gun; also in jars.



Cold Heading Dies and Punches, as well as Drawing Dies, are finished faster with Hyprez "OS".

Write for Complete Information or Free Demonstration to Dept. **W-1252**

HYPREZ DIVISION
ENGIS EQUIPMENT CO.
431 South Dearborn St. • Chicago 5, Ill.



BOYD'S NEW MULTI - HEAD SPOOLER

Winds wire on spools up to 14" in diam. Traverse of ½" to 8". Made with 2 to 12 spindles. Speeds up to 1200 F.P.M. All parts precision made.

BOYD & SONS MANUFACTURING CORP.
1434-38 Callowhill St., Philadelphia 30, Pa.

fewer REJECTS — faster PRODUCTION
with Cortland Brand WIRE

There'll be fewer rejects or production stoppages when you use Cortland Brand Wires. From one end to another, these specialized low-carbon wires are noted for their uniform quality. They're made from finest corrosion-resisting steel, drawn in Wickwire Brothers' own mills. Choose Cortland Brand Wires for all your products — in any of these finishes, types and sizes.

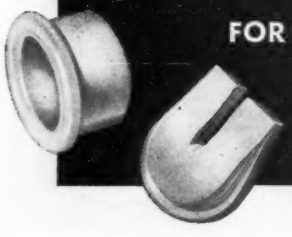
FINISH Plain, galvanized, coppered or tinned.

TYPE Stone wire, bookbinder, merchant trade, manufacturers and market, fine and weaving, etc. Coils, spools or straightened and cut to length.

Cortland BRAND
WICKWIRE BROTHERS, INC., Cortland, N.Y.

REELS **SPOOLS**
ALL SIZES
WOOD-PLYWOOD-WOOD-METAL
RETURNABLE NON-RETURNABLE
Samples and Prices on Request
DURKEE MFG. CO. **PINE RIVER, MINN.**

HEANIUM® WIRE GUIDES



FOR BETTER *PROVEN* PERFORMANCE AND LONG LIFE
Send for Detailed Information
HEANY INDUSTRIAL CERAMIC CORP.
NEW HAVEN 3, CONN.

letin are available from The Bristol Company, Waterbury 20, Conn.

New Electronic Tool For Maintenance Men

A new portable electronic instrument for locating sources of trouble in all types of mechanical equipment has just been announced by **Anco Instrument Division,** Chicago manufacturers.

★ ★ ★

Known as the Elec-Detec, this electronic stethoscope saves time, work and trouble for maintenance men by locating friction noises in bearings, pistons, gears, ratchets, cams, clutches, and other parts, it is stated.

★ ★ ★

The instrument uses a metal probe which serves as a microphone to locate the exact source of tell-tale noise. Sound impulses are transmitted through an amplifier to headphones. The Elec-Detec helps you diagnose the trouble and determine quickly where to make repairs without tearing down the entire equipment. Sounds can be detected at low speed that otherwise would be heard only at high speeds.

★ ★ ★

Elec-Detec is furnished complete with batteries and leather carrying case. Further details can be obtained direct from Anco Instrument Division, 4254 West Arthington Street, Chicago 24, Illinois.

The ABC of VCI

Two new illustrated bulletins on Volatile Corrosion Inhibitors, a modern method of protecting ferrous metals and aluminum from rust and corrosion without using oil or grease are offered by the **Berlin and Jones Co., Inc.**

★ ★ ★

This century old company's sales representatives found many buyers and engineers suffering from misinformation and a lack of sound basic information on VCI and "VPI" type corrosion inhibitors. As a result, a list of the questions most frequently asked were carefully compiled and then answered clearly and concisely by Lawrence N. Finch, Director of the Industrial Packaging Division, and his staff.

★ ★ ★

Technical Bulletin VT-1 was written to serve as a general primer, or ABC of VCI and "VPI" corrosion inhibitors. Among the many subjects

covered by questions and answers are: definitions of VCI, "VPI" and VIP; proper and improper applications; "bugs" to guard against; VCI as a control for finger print corrosion; toxicity; galvanic action; reactions with non-ferrous metals and non-metals; effects of moisture and condensation; shelf life and package life plus other basic data.

★ ★ ★

General Bulletin GB-1 deals specifically with Berlin and Jones' "DryVapor Pack-velopes, a positive protection for Steel and Aluminum". Cost saving and time saving advantages obtained from using these industrial engineered envelopes "In Production" and "In Final Shipment" are enumerated and explained. An interesting comparison of old and new methods of corrosion control, citing specific examples, is included in Bulletin GB-1.

★ ★ ★

Free samples of DryVapor Pack-velopes are also offered.

★ ★ ★

Any or all of the above may be obtained by addressing the Industrial Packaging Division of Berlin and Jones Co., Inc., 601 West 26th St., New York 1.

A. T. Both Now General Superintendent Chase's Cleveland Works

R. C. Diehl, president of **Chase Brass & Copper Company, Inc.,** has announced that Mead W. Batchelor, works manager of the company's Cleveland plants, has resigned to accept another position. **Albert T. Both,** general superintendent of the Cleveland plants, will be in active and complete charge. Mr. Both came to Chase in 1925, as a mill metallurgist at the Chase Metal Works, in Waterbury. He subsequently worked in the casting shop and in the wire and sheet mills at Waterbury, and particularly in the rod mill there.

★ ★ ★

In 1930, when Chase opened its mill in Cleveland, Mr. Both was transferred to that plant in charge of the rod mill. In Cleveland he progressed through the positions of assistant plant superintendent and general superintendent to the place he now holds as in charge of both the Babbitt Road and Upson Road plants of the company in Cleveland.

WE BUY WE SELL

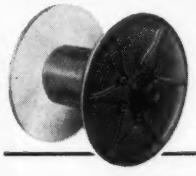
We Pay Highest Prices for Used Machinery
2 #0 WATERBURY-FARRELL
7-DIE ROD WIRE
DRAWING MACHINES
1 NEBCO 7-WIRE STRANDER
18"x10" Spools in Cradles—54" TAKE-UP STAND
Complete with 20-HP SLIP-RING MOTOR and CONTROLS
All Machines Reconditioned in Our Own Shop

WIRE & TEXTILE MACHINERY INC.
P. O. BOX 436, PAWTUCKET, R. I.

MILTON MACHINE
RUGGED in design... DEPENDABLE in service!

Save on replacement and maintenance!

RUGGED STEEL HEAVY DUTY PROCESSING REELS



Having trouble with light weight reels failing in heavy duty service? Send us a sketch or print stating the limiting dimensions and service required, we'll be glad to tell you about our facilities for supplying the wire rope and cable industry with special heavy duty processing reels, spools or bobbins. WRITE FOR BULLETIN 52-W.

MILTON MACHINE WORKS, Inc.
DESIGNERS – ENGINEERS – MANUFACTURERS
MILTON • PENNA.

MUSIC WIRE and SPECIAL WIRES
Music Wire for Industrial Purposes
In Over 100 Sizes, Polished and Tinned, from .0015" to .359" in dia.

Aluminum — Annealsd — Belt Lacing — Brass, Soft and Spring — Copper, Bare and Tinned Coppered Steel Spring — Galvanized — Tinned
Monel — Nickel Silver — Pure Soft Nickel — Oil tempered, Steel Spring, Black Finish Phosphor Bronze, Spring Temper — Picture Wire — Iron Wire, Pure — Resistance Wire, Hoskins Chromel "A" — Stainless, Soft and Spring Temper — Tag Wire, 1000 in an Envelope — Florist Wire — Spooled and Coiled, ¼-½-1-5#
Wires Straightened and Cut to length — Small Gauges — Small orders our specialty
Wires and Strands for the fishermen. Trolling Wires, Copper-Monel-Stainless. Leader Wires, "Wilstabrite" Stainless and "Silverbrite" Music.

THE MALIN & COMPANY
2514 Vestry Ave. Established in 1884 Cleveland 13, Ohio

***Buy the Best:* MONTGOMERY SILVER-COATED COPPER WIRE**
Round—Hard or Annealed on Spools. Plain or Stranded for HOOKUP and UHF CABLES.
Flat—For Tinsel Ribbons and Tinsel Garlands.
ALSO
Bare Electric Tinsel Conductors for Telephone-Razor-Hearing Aid Cords.
WRITE FOR DETAILS
Send for samples and engineering data.

THE MONTGOMERY COMPANY
25 Canal St., Windsor Locks, Conn. Tel.: 2-3338

YARNS

For electric wire. Acetate, nylon and silk, natural or dyed. Put up on braider tubes, spools or cops.

OSCAR HEINEMAN CORPORATION
Division of Aetna Industrial Corp.
DONALD G. BREWSTER
President and General Manager
2701 Armitage Avenue, Chicago 47, Illinois

CONCORD BRANCH
20 N. Kerr St., Concord, N. C.

Sales Agents

C. D. GOTT CO.
1001 Provident Bldg., Chattanooga, Tenn.
Tel. 7-8879

THOMAS C. ASSHETON CO.
11 West 42nd St., New York 18, N. Y.
Tel. PE 6-8280

FRANK LUNDAY
P. O. Box 1154, Charlotte, N. C.
Tel. Charlotte 8100

FOR 100 PER CENT
SATISFACTION
USE **WEDGE** REELS*
MADE BY
CARRIS REELS, INC.
SPECIALISTS IN NON-RETURNABLE REELS
RUTLAND, VERMONT
*Pat. Pending

THE MAN who is "YOUR WIRE SUPPLIER"

WIRE STRAIGHTENED AND CUT TO LENGTH
From 16 gauge up to ⅝" diam.
WE WILL FURNISH THE WIRE or STRAIGHTEN and CUT YOUR STOCK.
"Straight as an Arrow"
Telephone: ERIE 4-7139
ERIE IRON & SUPPLY CORPORATION
1059 EAST BUFFALO ROAD, ERIE, PENNA.

Top quality non-returnable spools . . available in standard head and barrel sizes.
Write for a quotation today!
MASON CAN COMPANY
1949 Dexter Rd., East Providence 14, R. I.
MASON CAN COMPANY OF OHIO
Greenville, Ohio

Triangle Conduit & Cable Enters Copper and Brass Tubing Field with New Mill

Triangle Conduit & Cable Company, Inc., manufacturers of wire, cable, conduit and plastic pipe, is entering the copper and brass tubing field with construction of a new mill at New Brunswick, N. J. The building is now being constructed; completion is scheduled for May, 1953.

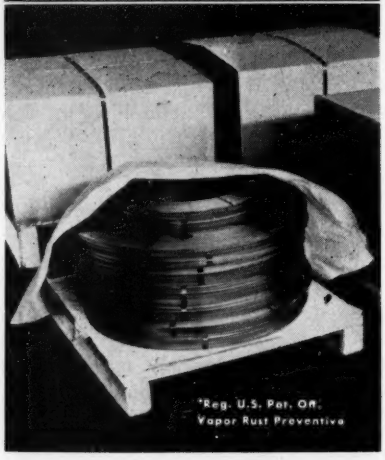
This plant is laid out in a manner that makes it possible for future expansion to double the capacity, without disrupting the operation of the present unit now under construction.

The building, all in a single story, 165′ wide by 760′ long, features long spans, large open areas, functional flow lines, modern equipment for material handling, and accessory attached buildings enclosing the office, locker, toilet and boiler plant facilities.

New TV Cable Sent to California

The Phelps Dodge Copper Products Corporation in Yonkers, New York, has delivered four thousand feet of Styroflex Coaxial Cable to

Vapor - from - Paper
STOPS RUST
Now wire is being protected in storage and in shipment without oil or grease. VPI vapor permeates area within carton. Makes air and moisture harmless to shiny wire surfaces. For "VPI Facts", write: Angier Corporation, Framingham 3, Mass.
ANGIER **VPI*** WRAP


*Reg. U.S. Pat. Off. Vapor Rust Preventive

METAL BOUND RETURNABLE REELS

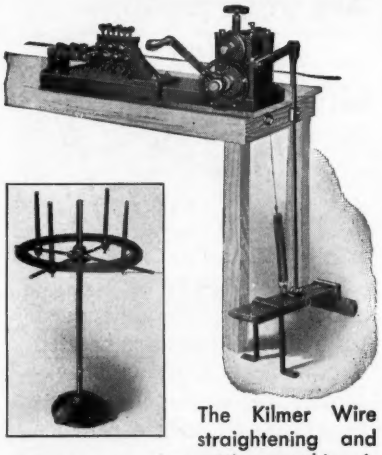
Made in 12" to 24" diameters.

No nails used. *All glued construction.* Made of kiln-dried wood. Special design prevents breaking or splintering of wood, protecting insulated wire from damage.

Write for details

WILLIAM McCASKIE, INC.
FORGE ROAD • WESTPORT • MASS.
Tel.: 145 Est. 1903

WIRE STRAIGHTENER



The Kilmer Wire straightening and cutting machine is hand operated and recommended for wire No. 8 to No. 19 gauge.
Wire Reel will handle coils up to 150 lbs. with I.D. adjustments from 7" to 22" and 30" O.D.

M. D. KILMER & COMPANY
4840 BROOKPARK RD.
CLEVELAND 9, OHIO

the International Telemeter Corporation for installation in an aerial, feeding television set owners in Palm Springs, California.

★ ★ ★

This high power, low loss cable is said to be the most effective available for this type of transmission.

★ ★ ★

This installation is reportedly the first community antenna use of this type of cable, although several radio stations are now using it for antenna leads, and many other uses in the ultra high frequency field are also known. There are nearly 300 installations of this type cable in Europe and expansion of its use in the United States is expected now that it is manufactured here.

Electric Salt Baths for Wire Processing

Under the above title an article was published in WIRE AND WIRE PRODUCTS, in which **H. J. Babcock,** Research Engineer for the **Ajax Electric Furnace Company** outlined the developments and improvements made in salt baths for wire heat treatment in recent years.

★ ★ ★

The paper covered the different types of salt baths and their applications and will be found to contain much helpful information that should help wire men to decide on types of salt bath furnaces and the uses to which they could be put in their mills in the processing of wire.

★ ★ ★

Copies of reprints of this paper may be procured by writing the Ajax Electric Company, Inc., Laurel Street at Delaware Avenue, Philadelphia 23, Pa.

Tensolon Wires, Insulated with Teflon Offered in 14 Colors in Sampling Spool Kits

The Tensolite Insulated Wire Co., Inc., 196 Main St., Tarrytown, N. Y., announces full-scale production of Tensolon high temperature hook-up wire in fourteen brilliant colors.

★ ★ ★

Tensolon, the exclusive product of the Tensolite Company, is the only wire insulated with Teflon by the tensulation process. These hook-up wires and multiple conductors are ideal for high temperature applications. Available in sizes from AWG 30 through 20 stranded silver-

WOOD REELS

• • •

That's Our Business

• • •

We make them well
We make them fast
We make them right
AT THE RIGHT PRICE

Reels from 12" dia. up

• • •

Canadian firms in the market for reels should contact

The J. HAMELIN LUMBER & WOODWORK LTD.

Lachine, Que.
Tel. NElson 5-4074
ESTABLISHED 1938

PORTER CARBIDE-EDGED CUTTERS

for extremely hard materials, including stainless steel.

Stand up under the hardest usage. Tough carbide edges firmly brazed to cutting jaws. Excellent for extra hard materials like stainless steel rods, wires, pins, etc. #3 cuts to 5/16" diam. #4 cuts to 3/8" diam. Pay for themselves many times over!

ORDER THROUGH YOUR INDUSTRIAL SUPPLY HOUSE

H. K. PORTER, INC., Somerville 43, Mass.
Manufacturers of PORTER CUTTERS, PORTER PRUNERS and PORTER-FERGUSON Auto Body Fender Repair Tools

Warner

BELL-MINE

LIME

for

WIRE DRAWING

WARNER COMPANY
BELLEFONTE DIVISION
BELLEFONTE, PA.
Sales Office
Philadelphia—Pittsburgh—New York

plated copper conductors. Temperatures from minus 55°C to plus 200°C cause no embrittlement, softening or deterioration. The insulation is clean-stripping, withstands abrasion and is immune to moisture and most solvents. Dielectric strength, insulation resistance and flexibility are exceptionally good.

★ ★ ★

The company is supplying Tensolon Colored Miniature Wires and Cables in sampling spools as follows in addition to production quantities.

★ ★ ★

Special kits offer economy to the design or research engineer requiring sample footage. Each kit contains twelve spools with 100 feet of AWG 22 in assorted colors. The twelve spools are furnished in a convenient desk-file dispenser.

★ ★ ★

Prices and complete information on Tensolon wire and cables including full engineering data will be supplied readers on request.

Opens District Office

The Beryllium Corporation, Reading, Pa., has opened a district sales office in the Suburban Station Bldg. of the Pennsylvania R. R., 16th St. & Pennsylvania Ave., Philadelphia.

High Speed Nickel Plating

An 8-page booklet with 10 illustrations and charts, giving the results of investigations of plating deposits of .001" to .003" in eleven minutes (at current densities of 100 to 300 amperes per square foot). Deposits exhibited equal corrosion resistance and compared in smoothness, buffing and mechanical characteristics with deposits from a

If you require

precision wire straightening and cutting

in diameter ranges from 1/16" to .005", you'll want to take advantage of the more than a decade of experience that Pittsburgh Cut Wire Company offers all industry. Regardless of what your wire straightening and cutting needs may be . . .

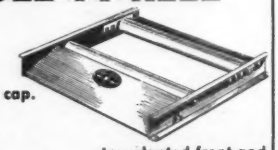
just call on . . .

Pittsburgh Cut Wire Co.
1120 Galveston Avenue
Pittsburgh 33, Pa.

Simple as A B C

Handle heavy reels easily and safely; remove wire or cable from top or bottom, front or back of reel with

ROLL-A-REEL



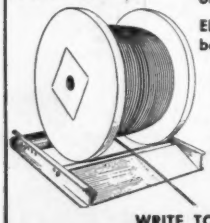
Style A: 2,000 lbs. cap. 37.50

Style B: 4,000 lbs. cap. 75.00

F.O.B. Cincinnati

Low slanted front and positive front lock insure quick loading or unloading.

Eliminate jacks, cumbersome handling.



Carried easily to reels, job or storage.

Sold through wholesalers only.

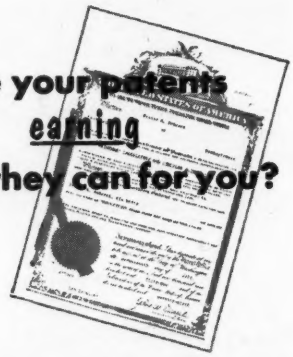
WRITE TODAY FOR DETAILS

ROLL-A-REEL
327 WEST FOURTH STREET
CINCINNATI 2 OHIO

GET THE BEST IN REELS
HOWSAM SPOOL COMPANY
AURORA • ILLINOIS
Exclusive Feature: "Pressure Pad" Fasteners. Patent applied for.

Diamond Dies
Guaranteed Perfect for Any Wire Drawing
Hoosier Wire Die Inc.,
P. O. BOX 423 FT. WAYNE, IND.

Are your patents earning all they can for you?



*P*atented machinery designed for one plant can often be used in other fields. Our sound background of machinery manufacturing and sales experience may lead you to profitable royalties by extending your patent uses. A confidential appraisal costs you nothing. Why not write us today.

Manufacturers of intricate precision machinery since 1911
FIDELITY MACHINE COMPANY INC.
3908-18 Frankford Avenue, Philadelphia 24, Pa., U.S.A.

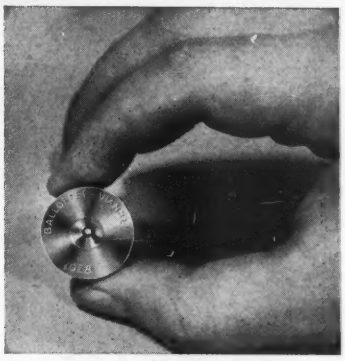
WAYNE DIAMOND WIRE DRAWING DIES

Quality in Diamonds + Perfection in Workmanship = Good Wire.

Satisfactory DIAMOND DIES can only be made by those who have experience, skill and knowledge. WAYNE has all of these. Users have called WAYNE DIES "the best."

WAYNE WIRE DIE CO., 200 Pennsylvania Ave., Hillside, N. J. Telephone: Elizabeth 2-2456

BALLOFFET VIANNEY WIRE DIE CO., Inc.



All sizes from .081" down to .0004" in stock from New York.

Manufacturers of Quality diamond dies since 1870

BALLOFFET VIANNEY WIRE DIE CO., Inc.
6825 ADAMS ST., GUTTENBERG, N. J.
Tel: Union 3-3393

NEW ENGLAND WIRE DIE CO.
7 Forsberg St., Worcester, Mass.
EXPERT RECUTTING
DIAMOND DIES, DIAMOND POWDERS
Eastern Representative of
Ajax Industrial Supplies, Inc.

DIAMOND WIRE DRAWING DIES and DIAMOND POWDER
INDIANA WIRE DIE COMPANY
314-324 E. Wallace St., Fort Wayne, Indiana
Phone: Harrison 4373

DIAMOND AND CARBIDE WIRE DRAWING DIES
DIAMOND POWDER
RUSCH WIRE DIE CORPORATION
Croton-on-Hudson, N. Y.

Wire Drawing Diamond Dies

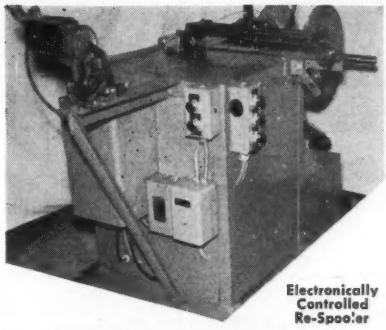
COCHAUD WIRE DIE CORPORATION
300 W. 56th St., NEW YORK
Tel. COlumbus 5-1340

DOUBLE YOUR PRODUCTION

THIS MACHINE FEATURES:

- *ELECTRONIC CONTROLS*
- *VARIABLE SPEED*
- *CONSTANT FOOTAGE*
- *AUTOMATIC ACCELERATION*
- *PUSH BUTTON CONTROL*
- *ELECTRIC BRAKE*
- *TRAVERSE GIVES CONSTANT LAY WITHOUT GEAR CHANGING*
- *RIGHT OR LEFT HAND DESIGN*

YOUR INQUIRIES INVITED



Electronically Controlled Re-Spooler

WIRE INSULATING MACHINERY, INC.
260 TOLLAND TPKE—STATION "A" MANCHESTER, CONN.

DIAMOND CARBIDE DIES
KELLY
WIRE DIE CORPORATION
19 W. 34th St. New York

DIAMOND DIES
.000's to .102"
For many years . . .
Outstanding in quality,
workmanship and service.
FORT WAYNE WIRE DIE, INC.
2625 E. Pontiac St., Fort Wayne, Ind.

TUNGSTEN CARBIDE WIRE DRAWING DIES

DESIGNED FOR LONG LIFE AND MAXIMUM WIRE PRODUCTION

Furnished semi-finished to within .001" to .002" of finished size at rough-drilled die prices. Require only light sizing and polishing before using. Our dies embody special design features that make for superior performance.

Also, a full line of carbide tooling for the Cold Heading Industry

EASTERN CARBIDE CORPORATION
NEW ROCHELLE, N. Y.

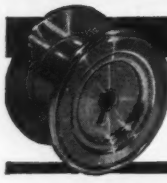
DIAMOND DIES
QUALITY HIGH—COST LOW
VICTOR J. BOULIN INC.
250 E. 43rd St., New York 17, N.Y.
Phone: ORegon 9-2578

DIAMOND POWDER
RECLAIMING
Industrial Diamond Powders
Incorporated
Box 613, New Kensington, Pa.

DANFORTH DIAMOND POWDER
Complete Reclaiming Services
Pat. applied for
THE C. W. DANFORTH CO.
(Established 1912)
Box 448 Youngstown, Ohio

DIAMOND DIES .0006 - .120 DIAMOND POWDER
INDUSTRIAL
AJAX
SUPPLIES INC.
R.R. 4, P. O. Box 66, Fort Wayne, Ind.

GET THE BEST IN REELS
HOWSAM SPOOL COMPANY
AURORA ● ILLINOIS
Exclusive Feature? "Pressure Pad" Fasteners. Patent applied for.


ACROPAK
Drawn Aluminum Alloy Spools for Precision Wire Packaging. Also Steel Spools for heavy duty processing.
ACROMETAL PRODUCTS, INC.
604-5 St., N., Minneapolis 1, Minn.

WIRE DRAWING MACHINERY AND EQUIPMENT
Rod Frames — 16" Frames, 8" Frames — Take-Up Frame, Wire — Pointers — Puller Tongs. — General and heat resisting alloy castings for wire mill use.
Circulars on Request.
E. J. SCUDDER FOUNDRY & MACHINE CO.
TRENTON, N. J.

TRAUWOOD
Patenting, Annealing, Tempering, Galvanizing, and Tinning equipment for wire.
TRAUWOOD ENGINEERING CO.
Cleveland, Ohio.

ZINC STRIP AND WIRE
THE PLATT BROS. & CO.
WATERBURY 20, CONN.

CAM MILLING • JIG BORING

A SPECIALIZED CAM MILLING SERVICE
JIG BORING SPOT WELDING CONTRACT PRODUCTION EXPERIMENTAL DEVELOPMENT
EISLER ENGINEERING CO., Inc.

Watts type bath. Plating solutions and procedures are given. Write to **International Nickel, Dept. EZ,** New York 5, N. Y., for your copy.

Photoelectric Smoke Indicator

To assure plant engineers that their plant smoke conditions are within the legal limits established by municipal ordinances and to provide a simple and direct method of maintaining a continuous check on overall combustion efficiency, **Combustion Control Corporation,** 720 Beacon St., Boston 15, Mass., offers Fireye Photoelectric Smoke Indicator Series FE. Fireye Series FE continuously indicates the density of smoke passing through the stack of a power plant and signals when the smoke density exceeds a preset valve.

★ ★ ★

The Indicators consist of three basic units: a Light Source, a Photoelectric Scanner, and a Control and Indicator combined in a single housing. The Light Source and Scanner are mounted on opposite sides of the stack or breeching and the indicator is placed at any convenient location, such as on the control panel. As smoke in the breeching passes through the light beam, the indicator shows a smoke density reading which can be easily read on the large 4½ inch indicator scale in both Ringelmann numbers and percent of smoke density. Red and green jewel lights provide visual indications of excessive or efficient smoke conditions.

★ ★ ★

These indicators incorporate many unique electrical and mechanical design features. The alarm can be set to operate at **any** predetermined value of smoke density from 10% to 100% light cut-off. Through the use of simplified mounting design and a specially designed shutter located in front of the light source lens, installation has been greatly simplified. The equipment is rugged, durable, requires a minimum of maintenance, and has been designed to operate under exacting industrial conditions of high temperature and excessive humidity.

★ ★ ★

Series FE Smoke Indicators are fully described in Bulletin CM506.

★ ★ ★

SLEEPER & HARTLEY, Inc.
Designers and Builders
SPRING COILERS
WIRE WORKING MACHINERY
WIRE MILL EQUIPMENT
SPECIAL MACHINERY
Address Inquiries to
WORCESTER, MASS.

WOOD & PLYWOOD REELS
for WIRE ROPE and INSULATED WIRE & CABLE
THE NELSON COMPANY
Standard Oil Bldg., Baltimore 2, Md.

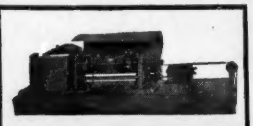
WIRE . . .
MUSIC • SPRING • STAINLESS
SPECIALTY WIRE CO., Inc.
110 GROVE ST. • WORCESTER 5, MASS.
Mfrs. of Steel and Alloy Wires

NEBUTT
MACHINERY FOR HIGH SPEED PRODUCTION
BRAIDERS TAKE-UPS STRANDERS
CABLERS BUNCHERS TAPING MACHINES
NEW ENGLAND BUTT COMPANY
304 Pearl Street, Providence 7, R. I.
James Day (Machinery) Ltd., 28 Maddox Street, London W1, Engla.

THE NEWBURY CO.
High and Low Carbon Steel Wire
UNION WHARF • BOSTON 13, MASS.
Tel.: Richmond 2-2277

CHEMSTEEL CONSTRUCTION COMPANY, INC.
205 Chemsteel Bldg., Walnut St., Pittsburgh 32, Pa.
Send data on Engineering & Construction facilities for
ACID-ALKALI-PROOF CONSTRUCTION
of pickling and other tanks; flooring.
(TEAR OUT & MAIL WITH LETTERHEAD)

HAVEG CORPORATION
NEWARK 47, DEL.
Manufacturers of Pickling and Plating *Corrosion-Resistant* Equipment

MODEL T-3 TORSION TESTER FOR WIRE

SCOTT TESTERS INC. 55 BLACKSTONE ST. PROVIDENCE 1, R. I.

Joins Staff of Plastic Wire and Cable

Edward O. Johnson, for the past twenty-five years associated with Plume and Atwood Manufacturing Company in Thomaston, Conn., has become a member of the production staff of the Plastic Wire and Cable Corporation in Jewett City, Conn.

★ ★ ★

Mr. Johnson, a metallurgist by training, has had a wide experience in non-ferrous wire manufacture; having started at the bottom, worked in all departments, risen to the post of General Superintendent and acted as Works Manager for some time prior to his joining the electric wire concern. His experience includes production, maintenance, construction, safety programs and union grievances.

New Use for Wire

The Wire Wheel Division of the Calvenar Company of Los Angeles, Cal., has brought out a new hub cap for motor car wheels made of stainless steel wire to replace the conventional hub cap.

In gratitude to our many customers in the wire industry for their patronage in the past year, we extend our greetings for a

Merry Christmas

and a

Prosperous New Year

We have devoted our best efforts to your interests in 1952 to the reclamation of used diamond powders through an exclusive process that salvages more and returns to you a better powder.

Thanks again for your business!

NATIONAL RESEARCH CO.

25530 Little Mack Avenue
St. Claire Shores, Michigan

Julius O. Carlson

Julius O. Carlson, 52, of 3503 Peter Street, plant superintendent for Canadian Steel Corporation at Ojibway since 1947 and a veteran of a lifetime in the steel wire industry, died suddenly on November 13th in Cleveland, Ohio.

★ ★ ★

Mr. Carlson had been attending the annual convention of The Wire Association at Cleveland. He died from a heart attack in his room at the Hotel Carter.

★ ★ ★

Born in Joliet, Illinois, Mr. Carlson was a member of a family which had been in the steel industry for many years. His father, Charles Carlson, who is 80 and lives at 3606 Barrymore Lane, is a former superintendent at Canadian Steel Corporation and still works as a die maker at the Ojibway plant. Mr. Carlson came to the Windsor area in 1929, after living for a short time in Chicago. He had also lived in Hamilton.

★ ★ ★

For many years Mr. Carlson served as general foreman at the Ojibway plant before his appointment as plant superintendent.

Made Manager of American Chain and Cable Plant

Charles H. Lucke was appointed in November as manager of the Bridgeport, Conn., plant of **American Chain & Cable Company, Inc.,** succeeding Alfred A. Hall, deceased.

★ ★ ★

Mr. Lucke has been with the company since 1944. Prior to that he was plant manager of Wilson Mechanical Instrument Company, manufacturers of Rockwell Hardness Testers, now a division of American Chain & Cable Company, Inc.

Bulletin on Wire Annealing

The Lee Wilson Engineering Company, 20005 West Lake Road, Cleveland, Ohio, has issued a new bulletin entitled "Wire Annealing". It describes the latest types of radiant tube-fired cylindrical bell-type furnace for annealing wire coils. They are in a position to furnish data for these furnaces, which are designed to both heat and cool wire uniformly and to work on shorter cycles. Copies of the bulletin available.

★ ★ ★

'Surface' HEAT TREATING **FURNACES** • FOR FERROUS AND NON-FERROUS WIRE. PREPARED ATMOSPHERE GENERATORS
SURFACE COMBUSTION CORPORATION
TOLEDO 1, OHIO

WORLD'S LARGEST MANUFACTURER
SPIRAL WRAPPING MACHINES
For Coils or Straight Lengths
Terkelsen Machine Company
323 A Street, Boston 10

WOOD REELS and SPOOLS
AMERICAN WOODWORKING COMPANY
1" to 60" Diameters
OVER 50 YEARS EXPERIENCE
1674 No. Lowell Avenue
Chicago, Ill.

101 ENGINEERING VERSATILITY
Engineered Application of Heat in Continuous Materials Handling Systems
INDUSTRIAL OVENS, INC.
13825 TRISKETT ROAD
CLEVELAND 11, OHIO

CORROSION-PROOF LININGS CEMENTS BRICK
• TANKS, FLOORS, FUME DUCTS AND PROCESS EQUIPMENT
• COMPLETE LINE OF PROTECTIVE COATINGS . .
Over a Quarter Century of Experience
CEILCOTE **CORROSION-PROOF** MATERIALS • CONSTRUCTION • SUPERVISION
The CEILCOTE Company 4832 Ridge Rd. Cleveland 9, O.

GET THE BEST IN REELS
HOWSAM SPOOL COMPANY
AURORA • ILLINOIS
Exclusive Feature: "Pressure Pad" Fasteners. Patent applied for.

Immediately Available
WIRE WORKING MACHINERY
FOURSLIDES: Baird, Nilson & Manville, Nos. 0, 1, 2, 3, 4, 5, 3-20, 4-26
U. S. Tool Co. No. 22, 28, & 33 Multislides
Sleeper & Hartley Spring Coilers Nos. 0, 1, 2, 3, 3½, 4, & 5
Vaughn Nos. 8, 10, & 12 Moto-Blocs
Waterbury No. 3 Bull Blocks, Duplex
Morgan 4 stand Wire Drawer with pointer and 100 H.P. motor drive & motor
Waterbury Nos. 1, 2, & 3 Continuous Wire Drawing Machines
PARTIAL STOCK LISTING
"The most diversified stock of machinery in the country. If it's machinery we have it."
National Machinery Exchange
130 Mott St., New York 13, N. Y.
CAnal 6-2470

Engineering and Professional Services

LANCASTER, ALLWINE & ROMMEL
REGISTERED PATENT ATTORNEYS
Suite 438, 815—15th St., N. W.
Washington 5, D. C.

Practice before U. S. Patent Office. Validity and Infringement Investigations and Opinions.

Booklet and form "Evidence of Conception" forwarded upon request.

CONSULTANT AND SPECIALIST
DRAWING LUBRICANTS
Hans C. Bick, Inc.
READING, PA.

FOR CORROSION AND FATIGUE TESTING OF WIRE, SEND SAMPLES AND STATEMENT OF YOUR PROBLEM TO
Fatigue of Materials Laboratory
BOX 367, PRINCETON, N. J.
Fees upon request

WALLACE G. IMHOFF CO.
CONSULTANTS IN
ZINC COATINGS
5617 Canary Drive
NORTH HIGHLANDS • CALIFORNIA

Well known French manufacturer, woven wire and wire gauze up to mesh 400, seeks representative for the United States.
Address Box 666
% **Wire & Wire Products**

COLD HEADING HELP WANTED
Plant superintendent for a medium sized plant. Exceptional opportunity for a thoroughly experienced man in all phases.
Reply — Box 647
WIRE AND WIRE PRODUCTS

Wanted to Buy
2 Plastic Extruders in good condition, one for small wire and one for jacketing. Also one 37-Bobbin Planetary Cabling machine.
Address Box #668
WIRE AND WIRE PRODUCTS

WANTED
1 or more 12-Hic Vaughn cone type wire drawing machines for drawing high carbon and alloy steel. Machines must be capable of speed up to 2000 feet per minute.
Reply Box #669
WIRE & WIRE PRODUCTS

WANTED TO PURCHASE
Bunchers, intermediate wire drawing machines, extruder capstan and takeup, automatic cutting and stripping machines, fine magnet wire serving machines.
Address Box #670
c/o WIRE & WIRE PRODUCTS

E. M. Kline Appointed General Manager of International Nickel's Huntington Works

E. M. Kline has been made General Manager of the Huntington (West Virginia) Works of The International Nickel Company, Inc., effective July 1, according to an announcement by Dr. Paul D. Merica, President of the company. Mr. Kline succeeds Herman M. Brown, who has elected to retire on June 30 under the company's Retirement Plan as General Manager, but whose services thereafter will be available to the company on a consulting basis.

★ ★ ★

E. M. Kline, born at Kittanning, Pennsylvania, attended Penn State College, from which he graduated in 1921 with a B. S. Degree in Chemistry. He then joined Pittsburgh Plate Glass Company (Columbia Chemical Division) in Barberton, Ohio, as an analytical chemist. In 1923, he joined International Nickel at the Huntington Works as Assistant Chief Chemist, and subsequently was appointed Chief Chemist in 1926 and Works Technical Director in 1939. Since 1947, Mr. Kline has been Assistant General Manager of the Huntington Works.

Alcoa Buys Roebling's Wire Screening Equipment

Aluminum Company of America is reported to have purchased the equipment for manufacturing insect wire screening formerly owned and operated by the Woven Wire Fabrics Division of the John A. Roebling's Sons Company, Trenton, N.J.

Alcoa plans to use this equipment for the manufacture of aluminum insect wire screening.

The equipment, now located at Roebling, N. J., is to be moved to an Alcoa plant for reconditioning. The company has not yet reached a decision as to where the wire weaving operations will be located.

It is anticipated that Alcoa will be producing aluminum screening by the latter part of the current year.

★ ★ ★

New Electric Immersion Heater Has Exclusive Features

First of its type to be tested and approved by leading electro-chemical suppliers, including the **Udylite Corp.**, the new "Glorod" Electric Immersion Heater overcomes the many problems inherent to the heating of corrosive solutions, according to **F. L. LeFebvre,** Manager, of **Cleveland Process Co.,** 7016 Euclid Ave., Cleveland, O.

The "Glorod" introduces a unique type of fused quartz heater, totally inert to acids, which requires no cleaning or maintenance. As one of the best electrical insulating materials known, fused quartz also eliminates "stray" currents in electroplating work.

★ ★ ★

Thoughtful engineering throughout is said to make it ideal for heating all electropolishing and electroplating baths as well as phosphatizing solutions. A few of the many features outlined by the manufacturer are functional design, versatility and light weight for easy handling. Rugged construction provides complete protection against physical abuse. Complete range of standard sizes are available from stock.

★ ★ ★

The new Glorod Bulletin containing full information, price list and technical details is available upon request. Cleveland Process Company specializes in the design and manufacture of radiant heating equipment.

Index to Advertisers

A

Acrometal Products Inc. 1346
Aetna-Standard Eng'g Co., The 1329
Ajax Electric Co., Inc. 1268
Ajax Industrial Supplies, Inc. 1346
American Chemical Paint Company 1247
American Insulating Machinery Company 1310
American Optical Company 1304
American Steel & Wire Div., U. S. Steel Company 1347
American Woodworking Co. 1347
Anchor Wire Corp. 1332
Angier Corporation, The 1342
Apco Mossberg Company 1330
Arkell Safety Bag Co. 1330
Art Wire and Stamping Company 1334

B

Baird Machine Co., The 1251
Balloffet-Vianney Wire Die Co., Inc. 1345
Bethlehem Steel Company 1246
Bick, Hans C., Inc. 1348
Boulin, Victor J., Inc. 1345
Boyd & Sons Mfg. Corp. 1340
Bridge Mfg. Co. 1267

C

Canada Reels Ltd. 1262
Carboloy Dept. of General Electric Co. ..... 1300 and 1301
Carl-Mayer Corp., The ..... 1332 and 1333
Carris Reels, Inc. 1342
The Ceilcote Company 1347
Chase Brass & Copper 1261
Chemsteel Construction Co., Inc. 1346
J. L. Clark Manufacturing Co. 1312
Cleveland Tramrail Division of the Cleveland Crane & Engineering Co. 1252
Cochaud Wire Die Corp. 1345
Continental Steel Corporation 1250
Cook Mfg. Co. 1336

D

Danforth Co., C. W., The 1346
Davis Electric Co. 1254
Diamond Tool Research Co., Inc. .....
Durant Mfg. Co. 1337
Durkee Mfg. Co. 1340
Dykrex Corporation of America—Roos Tool & Mfg. Div. 1338

E

Eastern Carbide Corp. 1345
Eisler Engineering Co., Inc. 1346
Electric Furnace Company, The ..... Back Cover
Electronic Rubber Co. 1333
Elgin National Watch Co., Abrasives Div. 1275
Emory, Robert J. Company 1336
Engis Equipment Co., Hyprez Div. 1339
Entwistle, James L., Co. ..... 1280 and 1317
Erie Iron & Supply Corp. 1342

F

Fatigue of Materials Laboratory 1348
Federal Mfg. Co. 1320
Fenn Manufacturing Company, The 1270
Fidelity Machine Co., Inc. ..... 1305 and 1344
Firth Sterling, Inc. 1245
Fisher Associates 1339
Fort Wayne Wire Die, Inc. 1345

G

Gerber, J. & Co., Inc. 1338
Glader, Wm. Machine Works 1309

H

Hamelin Lumber & Woodwork Ltd., J., The 1343
Haskell-Dawes Machine Co., Inc. 1335
Haveg Corporation 1346
Heany Industrial Ceramic Corp. 1340
Heineman Corp., Oscar 1342
Holden, A. F. & Co. 1273
Hoosier Wire Die, Inc. 1344
Howsam Spool Company ..... 1344-1346 and 1347
Hughesville Machine & Tool Company 1318

I

Imhoff, Wallace G., Co. 1348
Indiana Wire Die Company 1345
Industrial Diamond Powders, Inc. 1346
Industrial Ovens, Inc. 1347
International Paper Company, Container Division 1257

J

Johnson Steel & Wire Co., Inc. 1306

K

Kelly Wire Die Corporation 1345
Keystone Steel & Wire Company 1303
Kilmer, M. D. & Co. 1343

L

Lancaster, Allwine & Rommel 1348
Lewis Machine Company, The 1311

M

Magnus Chemical Co., Inc. .....
Malin & Company, The 1341
Malmedie Maschinenfabrik .....
Manco Mfg. Co. 1323
Marshall-Richards Machine Co., Inc. ..... 1253 and 1269
Mason Can Company 1342
McCaskie, Wm., Inc. 1343
Metal Carbides Corporation 1260
Metal and Thermit Corporation 1336
Mettler Machine Tool, Inc. 1313
Meyer, Roth & Pastor 1322
Micro Products Company 1302
Miller, R. H. Co., Inc. 1255
Milton Machine Works, Inc. 1341
Montgomery Co., The 1341
Morgan Construction Company ..... Front Cover
Morgardshammars Mek, Verkstads AB .....
Morrison Industries Inc. 1334
Mossberg Pressed Steel Corp. 1321

N

National Machinery Exchange 1347
National Research Co. 1347
National Rubber Machinery Co. 1319
Nelson Company, The 1346
Newbury Co., The 1346
New England Butt Company 1346
New England Lacquer Co. 1337
New England Wire Die Co. 1345
Niles Steel Products Div., Republic Steel Corp. 1249
A. H. Nilson Machine Company, The 1315
Nopco Chemical Co. 1324
North American Philips Co., Inc. .....
North Anson Reel Co. 1263
Norton Co. 1329

P

Pacific Coast Borax Company 1335
Parkin Chemical Co., The 1328
Pittsburgh Cut Wire Company 1344
Pittsburgh Steel Company 1276
Platt Brothers & Co., The 1346
Porter H. K., Inc. 1343
Pourtier Freres, Ets. 1322

R

Reilly-Whiteman-Walton Co. 1272
Republic Steel Corp., Pressed Steel Div., Niles, Ohio 1249
Rockwell, W. S., Co. 1330
Roebling's John A. Sons Company 1265
Roll-A-Reel 1344
Royle, John & Sons 1314
Rusch Wire Die Corporation 1345

S

Scott Testers, Inc. 1346
Scudder, E. J. Foundry & Machine Co., Inc. 1346
Sjogren Tool and Machine Co., Inc. 1331
Sleeper & Hartley, Inc. 1346
Solar Compounds Corporation 1307
Solomon, Michael .....
Specialty Wire Co., Inc. 1346
Standard Industrial Compounds Co., Inc. 1271
Standard Machinery Company, The 1266
Standard Mill Supply Co. 1327
Steel Equipment Co. 1314
Surface Combustion Corp. 1347
Swift & Company 1264
Syncro Machine Company 1256

T

Terkelsen Machine Co. 1347
Torrington Mfg. Co. .....
Trauwood Engineering Co., The 1346

U

United States Steel Co., American Steel & Wire Div. .....

V

Vascoloy-Ramet Corporation 1278
Vaughn Machinery Company 1259

W

Wafios Maschinenfabrik 1318
Wardwell Braiding Machine Co. 1308
Warner Company 1344
Wartenweiler, Emilio 1325
Waterbury Farrel Foundry & Machine Co. 1248
Watson Machine Company ..... Third Cover
Wayne Wire Die Co. 1345
Wean Equipment Corporation 1287
Wells, Frank L. Co. 1208
Wickwire Brothers, Inc. 1340
Wilson, Lee Engineering Co., Inc. ..... Second Cover
Winchester Reel Co., Inc. 1331
Wire Corporation 1316
Wire & Textile Machinery, Inc. 1341
Wire Insulating Mach'y Inc. 1345

Y

Youngstown Sheet & Tube Company, The 1258
Youngstown Welding & Engineering Company, The 1274

WHERE TO BUY

For more complete information, consult the annual Wire and Wire Products Buyers' Guide. Only advertisers who have contracted for six or more insertions are listed in this section.

ABRASIVES—
Ace Abrasive Laboratories, New York, N. Y.
Elgin National Watch Co., Abrasives Division, Elgin, Ill.
Norton Co., Worcester, Mass.

ACID INHIBITORS—
(See Inhibitors, Pickling)

ACID-PROOF CONSTRUCTION—
Ceilcote Company, Cleveland, Ohio
Chemsteel Construction Co., Pittsburgh, Pa.
Haveg Corporation, Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio

ANNEALING MACHINES — Electric Resistance
Syncro Machine Co., Perth Amboy, N. J.
Trauwood Engr. Co., Cleveland, O.

ANNEALING POTS AND BOXES—
Scudder, E. J. Foundry & Mach. Co., Trenton, N.J.

BAKERS—(See OVENS—Rod Bakers)

BOBBINS—Braider & Wire Weaving
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Milton Machine Works, Inc., Milton, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Standard Mill Supply Co., Pawtucket, R. I.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

BORAX—Wire Drawing
Pacific Coast Borax Co., New York, N. Y.

BORON CARBIDE—
Norton Co., Worcester, Mass.

BRAKES—Pneumatic
Entwistle, Jas. L. Co., Providence, R. I.

CARRIERS—Braider, High Speed
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

CARTONS—Paper
(See CONTAINERS—Paper, for nails, etc.)

CASTINGS—Wire Mill
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.

CEMENTS—Acid Proof
Ceilcote Company, Cleveland, Ohio

CEMENTS—Refractory
Norton Co., Worcester, Mass.

CLEANERS—Metal
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Phila., Pa.
Magnus Chemical Co., Garwood, N. J.
Metal & Thermit Corp., New York, N. Y.
Parkin Chemical Co., The, Pittsburgh, Pa.
Standard Industrial Compounds Co., Chicago, Ill.

CLEANING & PICKLING EQUIP.—
Ceilcote Company, Cleveland, Ohio
Chemsteel Construction Co., Pittsburgh, Pa.
Cleveland Tramrail Div., of the Cleveland Crane & Engineering Co., Wickliffe, O.
Haveg Corporation, Newark, Del.
Holden, A. F., Company, The, Detroit, Mich.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, Ohio
Wilson, Lee, Engr. Co., Cleveland, Ohio
Youngstown Welding & Eng'g. Co., Youngstown, Ohio

CLOTH—WIRE, All Metals
American Brass Co., The, Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Roebling's, John A. Sons, Co., Trenton, N. J.
Wickwire Bros., Cortland, N. Y.

COATING COMPOUNDS—
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

COMPOUNDS—Coppering
American Chemical Paint Co., Ambler, Pa.

COMPOUNDS—Diamond (Pre-Mixed)
Eastern Carbide Corp., New Rochelle, N. Y.
Elgin National Watch Co., Abrasives Division, Elgin, Ill.
Hyprez Div., Engis Equipment Co., Chicago, Ill.
Magnus Chemical Co., Garwood, N. J.

COMPOUNDS—Extrusion, for Wire
(See Compounds—Vinyl)

COMPOUNDS—For Improving Drawing and Extrusion
American Chemical Paint Co., Ambler, Pa.

COMPOUNDS—Metal Finishing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Metal & Thermit Corp., New York, N. Y.

COMPOUNDS—Phosphate Coating
American Chemical Paint Co., Ambler, Pa.

COMPOUNDS—Rust Preventing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.

COMPOUNDS—Rust Removing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Standard Industrial Compounds Co., Chicago, Ill.

COMPOUNDS—Vinyl, for Wire
Electronic Rubber Co., Stamford, Conn.

COMPOUNDS—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Bick, Hans C., Inc., Reading, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H. Co., Inc., Homer, N. Y.
Nopco Chemical Co., Harrison, N. J.
Pacific Coast Borax Co., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.
Swift & Company, Chicago, Ill.

CONDUCTORS—Flexible, Electrical
Montgomery Co., The, Windsor Locks, Conn.

CONTAINERS—Paper, for Nails, etc.
International Paper Company, Chicago, Ill.

COPHOLDERS—Steel
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

CORDS—Electrical, Tinsel Conductor
Montgomery Co., The, Windsor Locks, Conn.

CORROSION PREVENTIVE PAPERS—
Angier Corporation, The, Framingham, Mass.

CRANES—Wire Mill
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

CUTTING TOOLS—Carbide
Carboloy Dept. of General Electric Co., Detroit, Mich.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Metal Carbides Corporation, Youngstown, Ohio
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.

CUTTING TOOLS—Wire
Manco Manufacturing Co., Bradley, Ill.
Porter, H. K. Inc., Somerville, Mass.

DIAMONDS—Industrial
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIAMOND POWDERS—
Ace Abrasive Laboratories, New York, N. Y.
Danforth, The C. W. Co., Youngstown, Ohio
Elgin National Watch Co., Abrasives Division, Elgin, Ill.
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Hyprez Div., Engis Equipment Co., Chicago, Ill.
Indiana Wire Die Co., Ft. Wayne, Ind.
Industrial Diamond Powders, New Kensington, Pa.
National Research Company, St. Claire Shores, Mich.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIAMOND POWDER RECLAIMING—
Boulin, Victor J., Inc., New York, N. Y.
Danforth, The C. W. Co., Youngstown, Ohio
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Industrial Diamond Powders, Inc., New Kensington, Pa.
National Research Co., St. Claire Shores, Mich.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.

DIAMOND TOOLS—
Carboloy Dept. of General Electric Co., Detroit Mich.
Diamond Tool Research Co., Inc., New York, N. Y.
Indiana Wire Die Co., Ft. Wayne, Ind.
Metal Carbides Corporation, Youngstown, Ohio
Wayne Wire Die Co., Hillside, N. J.

DIES—Carbide, Tungsten & Tantalum
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc., New York, N. Y.
Carboloy Dept. of General Electric Co., Detroit, Mich.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Wayne Wire Die Co., Hillside, N. J.

DIES—Cold Heading
Carboloy Dept. of General Electric Co., Detroit, Mich.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Indiana Wire Die Co., Ft. Wayne, Ind.
Metal Carbides Corporation, Youngstown, Ohio
Vascoloy-Ramet Corp., No. Chicago, Ill.

DIES—Diamond
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc., New York, N. Y.
Cochaud Wire Die Corp., New York, N. Y.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
New England Wire Die Co., Worcester, Mass.
North American Philips Co., Inc., New York, N.Y.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIES—Extrusion
Carboloy Dept. of General Electric Co., Detroit, Mich.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Metal Carbides Corporation, Youngstown, Ohio
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIES—Eyelet
Eastern Carbide Corp., New Rochelle, N. Y.
Kelly Wire Die Corp., New York, N. Y.

DIES—Pointing
Sjogren Tool and Machine Co., Auburn, Mass.

DIES—Repairs & Re-Cutting
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc., New York, N. Y.
Carboloy Dept. of General Electric Co., Detroit, Mich.
Cochaud Wire Die Corp., New York, N. Y.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corporation, Youngstown, Ohio
New England Wire Die Co., Worcester, Mass.
North American Philips Co., Inc., New York, N. Y.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Wayne Wire Die Co., Hillside, N. J.

DIES—Special Shapes, Etc.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Indiana Wire Die Co., Ft. Wayne, Ind.

DIES—Swaging
Sjogren Tool and Mach. Co., Inc., Auburn, Mass.

DIES—Tube Drawing
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Carboloy Dept. of General Electric Co., Detroit, Mich.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.

DRAW BENCHES—
(See MACHINERY—Draw Benches)

DRUMS & TRAVERSES—Flange Steel
Entwistle, Jas. L. Co., Providence, R. I.
Niles Steel Products Division, Republic Steel Corporation, Niles, Ohio

DRYING EQUIPMENT—
Carl-Mayer Corp., The, Cleveland, Ohio
Industrial Ovens, Inc., Cleveland, Ohio
Rockwell, W. S. Co., Fairfield, Conn.

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

ENGINEERS—Consulting
Metal Fatigue—Fatigue of Materials Laboratory, Princeton, N. J.
Wire Insulating and Rubber and Plastics Processing —Hale and Kullgren, Inc., Akron, Ohio
Wire Mill—Lewis, Kenneth B., Worcester, Mass.
Zinc—Imhoff, Wallace G., Co., No. Highlands, Calif.

EYELETS—Brass or Zinc
Platt Bros. & Co., The, Waterbury, Conn.

FENCING & FENCES—Wire
Interlocking Fence Co., Morton, Ill.

FOAM PRODUCING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Parkin Chemical Co., The, Pittsburgh, Pa.

FURNACES—Brazing
Electric Furnace Co., Salem, Ohio
Harper Electric Furnace Corp., Buffalo, N. Y.
Rockwell, W. S. Co., Fairfield, Conn.
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

FURNACES—Galvanizing Equipment
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio
Holden, A. F., Co., The, Detroit, Mich.
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio
Trauwood Engineering Co., The, Cleveland, Ohio
Wilson, Lee, Engr. Co., Cleveland, Ohio

FURNACES—Heat Treating
Ajax Electric Co., Inc., Philadelphia, Pa.
Carl Mayer Corp., The, Cleveland, Ohio
Electric Furnace Co., Salem, Ohio.
Holden, A. F., Co., The, Detroit, Mich.
Morrison Industries, Bedford, Ohio.
Rockwell, W. S., Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio
Trauwood Engr. Co., Cleveland, Ohio.
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.
Wilson, Lee, Engr. Co., Cleveland, Ohio

FURNACES—Lead Melting
Electric Furnace Co., Salem, Ohio
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

FURNACES—Pot (oil, gas, electric)
Ajax Electric Co., Inc., Philadelphia, Pa.
Holden, A. F., Co., The, Detroit, Mich.
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

FURNACES—Resistance Heating, Strand
(See Annealing Machines)

FURNACES—Salt Bath
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio
Holden, A. F., Co., The, Detroit, Mich.
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

GALVANIZING EQUIPMENT — (See MACHINERY—Galvanizing Wire)

GRINDERS—Roll
Norton Co., The, Worcester, Mass.

GUIDES—for Wire
Heany Industrial Ceramic Corp., New Haven, Conn.

HAMMERS—Swaging
Sjogren Tool and Machine Co., Auburn, Mass.

HOOKS—Pickling & Liming
Heil Process Equipment Corp., Cleveland, Ohio
Youngstown Welding & Eng'g. Co., Youngstown, Ohio

HOISTS—Electric Travelling
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, Ohio

IMPREGNATING MATERIALS—
Solar Compounds Corporation, Linden, N. J.

INHIBITORS—Pickling
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Parkin Chemical Co., The, Pittsburgh, Pa.

INSULATING MATERIALS—
Electronic Rubber Co., Stamford, Conn.
Glass Fibers, Inc., Toledo, Ohio
Heineman Corp., Oscar, Chicago, Ill.
Merrimac Paper Co., New York, N. Y.
New England Lacquer Co., E. Providence, R. I.
Solar Compounds Corporation, Linden, N. J.
Solar Varnish Corp., Linden, N. J.

INSULATING MATERIALS—Paper—For Electric Wire Cable.
Merrimac Paper Co., New York, N. Y.
Solar Compounds Corporation, Linden, N. J.
Solar Varnish Corp., Linden, N. J.

LACQUERING SYSTEMS — See MACHINERY—Lacquering Electric Wire

LACQUERS—For Electric Wire
New England Lacquer Co., E. Providence, R. I.
Solar Compounds Corporation, Linden, N. J.

LAME—LAHN—
Montgomery Co., The, Windsor Locks, Conn.

LIME—
Warner Co., Philadelphia and Bellefonte, Pa.

LUBRICANTS — For Metal Cutting, Stamping and Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Nopco Chemical Co., Harrison, N. J.
Standard Industrial Compounds Co., Chicago, Ill.

LUBRICANTS—Wire Drawing
(See Compounds—Wire Drawing)

LUBRICANTS—Wire Rope
Swift & Co., Chicago, Ill.

LUMBER—Wire Mill, Carload shipments for lagging and car blocking
North Anson Reel Co., No. Anson, Me.

MACHINERY—Armoring (Cable, Wire Hose)
American Insulating Mach'y Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc., (used), Pawtucket, R. I.

MACHINERY—Barbed Wire
Glader Machine Works, Chicago, Ill.
Wean Engineering Co., Cleveland, Ohio

MACHINERY—Bolts & Rivets
Meyer, Roth & Pastor Maschinenfabrik, Koln-Raderberg, Germany

MACHINERY—Braiding
Fidelity Machine Co., Inc., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Solomon, Michael, New York, N. Y.
Wardwell Braiding Machine Co., Central Falls, R. I.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

MACHINERY—Bunching
Cook Manufacturing Co., The, Paterson, N. J.
Federal Manufacturing Co., Wallingford, Conn.
Haskell-Dawes Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

MACHINERY—Bundling, Scrap
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Cable, Electric
American Insulating Mach'y Co., Phila., Pa.
Fidelity Machine Co., Inc., Philadelphia, Pa.
Haskell-Dawes Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Capstans (See Machinery—Winding Wire)

MACHINERY—Chain Making
Meyer, Roth & Pastor Maschinenfabrik, Koln-Raderberg, Germany
Nilson, A. H. Machine Co., Bridgeport, Conn.

MACHINERY—Closing Rope
Watson Machine Co., Paterson, N. J.

MACHINERY—Coiling Rod
Vaughn Mach'y Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Cold Heading
Waterbury-Farrel Fdry. Mach. Co., Waterbury, Conn.

MACHINERY—Copper Wire Drawing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
American Insulating Mach'y Co., Phila., Pa.
Fenn Manufacturing Co., The, Hartford, Conn.
Hale and Kullgren, Inc., Akron, Ohio
National Mach'y Exch. (Used), New York, N. Y.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Covering Wire (See MACHINERY—Insulating Wire)

MACHINERY—Cutting
Eisler Engineering Co., Newark, N. J.
Lewis Machine Co., The, Cleveland, Ohio
Manco Manufacturing Co., Bradley, Ill.
Mettler Machine Tool, Inc., New Haven, Conn.
Porter, H. K., Inc., Somerville, Mass.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Descaling Rod, Dry
Fisher Associates, New York, N. Y.

MACHINERY—Die Making
Victor J. Boulin, Inc., New York, N. Y.
Carboloy Dept. General Electric Co., Detroit, Mich.
Firth Sterling, Inc., Pittsburgh, Pa.
Kelly Wire Die Corp., New York, N. Y.
Dykrex Corp., Roos Tool & Mfg. Div., Newark, N. J.
Wayne Wire Die Co., Hillside, N. J.

MACHINERY—Draw Benches
Morgan Construction Co., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wartenweiler, Emilio, Milano, Italy

MACHINERY—Edging (See MACHINery — Tandem Rolling and Edging Mills)

MACHINERY—Enameling
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Industrial Ovens, Inc., Cleveland, Ohio
Michigan Oven Co., Detroit, Mich.

MACHINERY—Extruding
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Hale and Kullgren, Inc., Akron, Ohio
National Rubber Machinery Co., Akron, Ohio
Royle, John, & Sons, Paterson, N. J.
Standard Machinery Co., Mystic, Conn.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Fence
Glader, Wm., Machine Works, Chicago, Ill.
Interlocking Fence Co., Morton, Ill.
Malmedie Maschinenfabrik, Dusseldorf, Germany
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Filament Coil Winding
Eisler Engineering Co., Newark, N. J.

MACHINERY—Flat Wire
Fenn Manufacturing Co., The, Hartford, Conn.
Mettler Machine Tool, Inc., New Haven, Conn.
Stanat Manufacturing Co., Long Island City, N. Y.
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Forming Wire
Baird Machine Co., Stratford, Conn.
Nilson, A. H., Machine Co., Bridgeport, Conn.

MACHINERY—Galvanizing Wire
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, O.
Wilson, Lee, Engr. Co., Cleveland, Ohio

MACHINERY—Gang Winders
Entwistle, Jas. L. Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Grinding
Norton Co., The, Worcester, Mass.

MACHINERY—Insulating Wire
Aetna-Standard Engineering Co., Pittsburgh, Pa.
American Insulating Mach'y Co., Phila., Pa.
Ets. Pourtier Frères, Romainville, France
Fidelity Machine Co., Inc., Philadelphia, Pa.
Hale and Kullgren, Inc., Akron, Ohio
National Rubber Machinery Co., Akron, Ohio
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Solomon, Michael, New York, N. Y.
Syncro Machine Co., Perth Amboy, N. J.
Wardwell Braiding Machine Co., Central Falls, R.I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Knitting
Fidelity Machine Co., Inc., Philadelphia, Pa.

MACHINERY—Lacquering Electric Wire
American Insulating Mach'y Co., Philadelphia, Pa.
Industrial Ovens, Inc., Cleveland, O.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Looms, Wire Weaving
Interlocking Fence Co., Morton, Ill.

MACHINERY—Material Handling (See Material Handling Equipment)

MACHINERY—Measuring Wire & Cable
Davis Electric Co., Wallingford, Conn.
Durant Mfg. Co., Milwaukee, Wis.
Entwistle, Jas. L. Co., Providence, R. I.
New England Butt Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

MACHINERY—Nail and Tack
Baird Machine Co., The, Stratford, Conn.
Glader, Wm., Machine Works, Chicago, Ill.
Meyer, Roth & Pastor Maschinenfabrik, Koln-Raderberg, Germany
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Pickling
Chemsteel Construction Co., Pittsburgh, Pa.
Youngstown Welding & Eng'g. Co., Youngstown, Ohio

MACHINERY—Pin Making
Baird Machine Co., The, Stratford, Conn.

MACHINERY—Pointing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Hale and Kullgren, Inc., Akron, Ohio
Meyer, Roth & Pastor Maschinenfabrik, Koln-Raderberg, Germany
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N. Y.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Poultry Wire Fencing
Interlocking Fence Co., Morton, Ill.
Malmedie Maschinenfabrik, Dusseldorf, Germany
Wean Equipment Corp., Cleveland, O.

MACHINERY—Power Transmission
Reeves Pulley Company, Columbus, Indiana

MACHINERY—Pre-Heater for Wire (for Extrusion of Plastics)
Industrial Ovens, Inc., Cleveland, Ohio
National Rubber Machinery Co., Akron, Ohio

MACHINERY—Re-Spoolers
Boyd & Sons Manufacturing Corp., Philadelphia, Pa.
Davis Electric Co., Wallingford, Conn.
Eisler Engineering Co., Newark, N. J.
Emory, Robert J., Co., Newark, N. J.
Entwistle, Jas. L. Co., Providence, R. I.
National Mach'y Exch. (Used), New York, N. Y.
Steel Equipment Co., Cleveland, Ohio
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.
Wean Equipment Corp., Cleveland, Ohio
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.
Wire Insulating Machy., Inc., Manchester, Conn.

MACHINERY—Rod Mill
Morgan Construction Co., Worcester, Mass.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Rolling Mill
Morgan Construction Co., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Engineering Co., Cleveland, Ohio

MACHINERY—Rubber Insulating
National Rubber Machinery Co., Akron, Ohio
Rovle, John & Sons, Paterson, N. J.
Standard Machinery Co., Mystic, Conn.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

MACHINERY—Spark Testing
Davis Electric Co., Wallingford, Conn.
Entwistle, Jas. L. Co., Providence, R. I.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

MACHINERY—Slitting
Stanat Manufacturing Co., Long Island City, N. Y.

MACHINERY—Spring Making
Carlson Company, The, New York, N. Y.
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Wells, Frank L., Co., Kenosha, Wisc.

MACHINERY—Staple
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Straightening & Cutting
Fenn Manufacturing Co., The, Hartford, Conn.
Kilmer, M. D., & Co., Cleveland, Ohio
Lewis Machine Co., The, Cleveland, Ohio
Mettler Machine Tool Co., New Haven, Conn.
Meyer, Roth & Pastor Maschinenfabrik, Koln-Raderberg, Germany
National Mach'y Exch. (Used), New York, N. Y.
Stanat Manufacturing Co., Long Island City, N. Y.
Wartenweiler, Emilio, Milano, Italy
Wells, Frank L., Co., Kenosha, Wisc.

MACHINERY—Stranding
Haskell-Dawes Machine Co., Philadelphia, Pa.
Hughesville Machine & Tool Co., Hughesville, Pa.
Milton Machine Works, Inc., Milton, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Swaging
Fenn Manufacturing Co., The, Hartford, Conn.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Take-Up and Pay-Out
Aetna-Standard Engineering Co., Pittsburgh, Pa.
American Insulating Mach'y Co., Phila., Pa.
Davis Electric Co., Wallingford, Conn.
Federal Manufacturing Co., Wallingford, Conn.
Hale & Kullgren, Inc., Akron, Ohio
Industrial Ovens, Inc., Cleveland, Ohio
Marshall-Richards Machine Co., Inc., Trenton, N.J.
Standard Machinery Co., Mystic, Conn.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.
Wire Insulating Machy., Inc., Manchester, Conn.

MACHINERY—Taping
American Insulating Mach'y Co., Phila., Pa.
Ets. Pourtier Frères, Romainville, France
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

MACHINERY—Testing, Physical
Scott Testers, Inc., Providence, R. I.

MACHINERY—Tinning Wire
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Steel Equipment Co., Cleveland, Ohio
Syncro Machine Co., Perth Amboy, N. J.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Tinsel Rolling Mills
American Insulating Mach'y Co., Phila., Pa.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Trolley Wire
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill, Cold Drawing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Hale & Kullgren, Inc., Akron, Ohio
Marshall-Richards Machine Company, Inc., Trenton, N. J.
Mettler Machine Tool, Inc., New Haven, Conn.

MACHINERY—Tube Winders
Solomon, Michael, New York, N. Y.

MACHINERY—Twinning
(See Mach.—Bunching)

MACHINERY—Twisters, Wire
Cook Manufacturing Co., The, Paterson, N. J.
Davis Electric Co., Wallingford, Conn.
Federal Manufacturing Co., Wallingford, Conn.
Haskell-Dawes Machine Co., Philadelphia, Pa.

MACHINERY—Used
National Machinery Exchange, New York, N. Y.
Solomon, Michael, New York, N. Y.
Wire & Textile Machy., Inc., Pawtucket, R. I.

MACHINERY—for Wire Welding (See WELDERS—Butt and Spot)

MACHINERY—Winding Wire
Eisler Engineering Co., Newark, N. J.
Entwistle, Jas. L., Co., Providence, R. I.
Federal Manufacturing Co., Wallingford, Conn.
New England Butt Co., Providence, R. I.
Standard Mill Supply, Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.
Wire Insulating Machy., Inc., Manchester, Conn.

MACHINERY—Wire Bending
Eisler Engineering Co., Newark, N. J.
Kilmer, M. D., & Co., Cleveland, Ohio

MACHINERY—Wire Drawing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Fenn Manufacturing Co., The, Hartford, Conn.
Hale & Kullgren, Inc., Akron, Ohio
Herborn Maschinenfabrik, Herborn, Germany
Marshall-Richards Machine Co., Inc., Trenton, N.J.
Morgan Construction Co., Worcester, Mass.
Morgardshammars Mek. Verkstads AB Morgadshammar, Sweden
National Mach'y Exch. (Used), New York, N. Y.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Stanat Manufacturing Co., Long Island City, N. Y.
Steel Equipment Co., Cleveland, Ohio
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Wire Forming
Baird Machine Co., The, Stratford, Conn.
Kilmer, M. D., & Co., Cleveland, Ohio
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Wire Rope
Milton Machine Works, Inc., Milton, Pa.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wrapping with Paper
Angier Corporation, The, Framingham, Mass.
Marshall-Richards Machine C., Inc., Trenton, N. J.
Terkelsen Machine Co., Boston, Mass.

MATERIAL HANDLING EQUIPMENT—
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

MILLS—Tandem, Rolling & Edging
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Co., Cleveland, Ohio

NAILS—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling, John A. Sons Co., Trenton, N. J.
Wickwire Brothers, Inc, Cortland, N. Y.

OVENS—Cable Lacquering
American Insulating Mach'y Co., Phila., Pa.
Carl-Mayer Corp., The, Cleveland, Ohio
Industrial Ovens, Inc., Cleveland, Ohio
Morrison Industries, Bedford, Ohio
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

OVENS—Rod Bakers
Carl-Mayer Corp., The, Cleveland, Ohio
Michigan Oven Co., Detroit, Mich.
Morrison Industries, Bedford, Ohio

OVENS—Welding Rod Coating
Carl-Mayer Corp., The, Cleveland, Ohio
Industrial Ovens, Inc., Cleveland, Ohio
Morrison Industries, Bedford, Ohio

PAINT—Acid Proof
Ceilcote Company, Cleveland, Ohio

PAINT BONDING CHEMICALS—
American Chemical Paint Co., Ambler, Pa.

PAINTS—Heat Resisting
American Chemical Paint Co., Ambler, Pa.
Solar Compounds Corp., Linden, N. J.

PAPER—Creped Wrapping
Angier Corporation, The, Framingham, Mass.
Arkell Safety Bag Co., New York, N. Y.
Terkelsen Machine Co., Boston, Mass.

PAPER—For Coil Wrapping and Corrosion Prevention
Angier Corporation, The, Framingham, Mass.
Arkell Safety Bag Co., New York, N. Y.
Terkelsen Machine Co., Boston, Mass.

PATENT ATTORNEYS—
Lancaster, Allwine & Rommel, Washington, D. C.

PAY-OUT SYSTEMS—(See MACHINERY—Take-Up & Pay-Out)

PHOSPHATE COATING CHEMICALS—(See COMPOUNDS—Phosphate Coating)

PICKLING COMPOUNDS—
See (Inhibitors—Pickling)

PICKLING—Hooks, etc. Acid Resisting
Youngstown Welding & Eng'g. Co., Youngstown, Ohio

PICKLING TANK LININGS—
Chemsteel Construction Co., Pittsburgh, Pa.
Haveg Corp., Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio

PIPES & FITTINGS—Acid Resistant
Haveg Corp., Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio

POTS—Lacquer
Industrial Ovens, Inc., Cleveland, Ohio

PRESSES—Hydraulic and Mechanical
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Hale & Kullgren, Inc., Akron, Ohio
Standard Machinery Co., Mystic, Conn.

PULLERS AND GRIPS—For Wire
Morgan Construction Co., Worcester, Mass.
Scudder, E. J. Fdry & Mach. Co., Trenton, N. J.
Sjogren Tool and Machine Co., Auburn, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, Ohio

REEL AND TENSION STANDS—
Davis Electric Co., Wallingford, Conn.
Entwistle, Jas. L. Co., Providence, R. I
Fidelity Machine Company, Inc., Philadelphia, Pa.
Industrial Ovens, Inc., Cleveland, Ohio.
Kilmer, M. D., & Co., Cleveland, Ohio
Roll-A-Reel, Cincinnati, Ohio.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Mill Supply Co., Pawtucket, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire Insulating Machy., Inc., Manchester, Conn.

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

REEL CRUTCHES—
Roll-A-Reel, Cincinnati, Ohio
Watson Machine Co., Paterson, N. J.

REELS & SPOOLS—Aluminum Alloy
Acrometal Products, Inc., Minneapolis, Minn.
Milton Machine Works, Inc., Milton, Pa.

REELS & SPOOLS—Annealing and Stranding
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Co., Aurora, Ill.
Milton Machine Works, Inc., Milton, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp. Niles, Ohio

REELS—Metal Bound
Durkee Mfg. Co., Pine River, Minn.
Howsam Spool Co., Aurora, Ill.
McCaskie, Inc., Wm., Westport, Mass.
North Anson Reel Co., No. Anson, Me.

REELS—Plywood
Carris Reels, Inc., Rutland, Vt.
McCaskie, Inc., Wm., Westport, Mass.
Nelson Company, The, Baltimore, Md.
Winchester Reel Co., Ashuelot, N. H.

REELS & SPOOLS—Steel (All Types)
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Clark, J. L., Mfg. Co., Rockford, Ill.
Howsam Spool Co., Aurora, Ill.
Mason Can Company, East Providence, R. I.
Milton Machine Works, Inc., Milton, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp. Niles, Ohio

REELS—Wire Mill
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Bridge Mfg. Co., The, Hazardville, Conn.
Carris Reels, Inc., Rutland, Vt.
Durkee Mfg. Co., Pine River, Minn.
Dykrex Corp., Roos Tool & Mfg. Div., Newark, N.J.
Hamelin, J., Lumber & Woodwork, Ltd., Lachine, P. Q., Can.
Howsam Spool Co., Aurora, Ill.
Mason Can Company, East Providence, R. I.
Milton Machine Works, Inc., Milton, Pa.
McCaskie, Inc., Wm., Westport, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Mettler Machine Tool, Inc., New Haven, Conn.
Niles Steel Products Div., Republic Steel Corp. Niles, Ohio
North Anson Reel Co., No. Anson, Me.
Winchester Reel Co., Ashuelot, N. H.

REELS & SPOOLS—Wooden
Acrometal Products, Inc., Minneapolis, Minn.
American Woodworking Co., Chicago, Ill.
Bridge Mfg. Co., Inc., The, Hazardville, Conn.
Carris Reels, Inc., Rutland, Vt.
Durkee Mfg. Co., Pine River, Minn.
Hamelin, J., Lumber & Woodwork, Ltd., Lachine, P. Q., Can.
Nelson Company, The, Baltimore, Md.
North Anson Reel Co., No. Anson, Me.
Winchester Reel Co., Ashuelot, N. H.

REFRACTORIES—High Temperature
Norton Company, Worcester, Mass.

ROD BAKERS— (See Ovens—Rod Bakers)

RODS—Stainless Steel
American Steel & Wire Co., Cleveland, Ohio
Pittsburgh Steel Co., Pittsburgh, Pa.

RODS—Wire—Non-Ferrous
American Brass Co., The, Waterbury, Conn.
Platt Bros. & Co., The, Waterbury, Conn.

RODS—Wire, Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Indiana.
Erie Iron & Supply Corp., Erie, Pa.
Gerber, J., & Co., Inc., New York, N. Y.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Company, Pittsburgh, Pa.
Roebling's, John A., Sons Co., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

ROPE—Wire
American Steel & Wire Company, Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Roebling's John A., Sons Co., Trenton, N. J

RUST PROOF COMPOUNDS— (See Compounds—Rust Preventing)

RUST REMOVING COMPOUNDS— (See Compounds—Rust Preventing)

SALTS—Heat Treating, Descaling, etc.
Holden, A. F., Co., The, Detroit, Mich.

SATURATION SYSTEMS—
Industrial Ovens, Inc., Cleveland, Ohio
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.

SOAPS—Industrial and Wire Drawing (See Compounds—Wire Drawing)

SODIUM—for Descaling
Holden, A. F., Co., The, Detroit, Mich.

SPOOLS—(See Reels & Spools)

SPOOLS—Stamped Metal for Retail Wire Sales
Clark, J. L. Mfg. Co., Rockford, Ill.
Mason Can Co., East Providence, R. I.

STAMPINGS—Steel
Acrometal Products, Inc., Minneapolis, Minn.
Art Wire and Stamping Co, Newark, N. J.
Mossberg Pressed Steel Corp., Attleboro, Mass.

STRIP—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Roebling's John A., Sons Co., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

TANKS—Compound
Watson Machine Co., Paterson, N. J.

TANKS—Pickling and Plating
Ceilcote Company, Cleveland, Ohio
Chemsteel Construction Co., Pittsburgh, Pa.
Heil Process Equipment Corp., Clevel.nd. Ohio

TESTERS — INSULATION (See MACHINERY—Spark Testers)

TESTING EQUIPMENT (See MACHINERY Testing, Physical)

TINNING PROCESS—
Metal & Thermit Corp., New York, N. Y.

TINSEL—Electric Conductor
Montgomery Co., The, Windsor Locks, Conn.

TINSEL WIRE—Resistance, Lame, Decorative Cords Thread—Bare Copper, Silver and False Gold Coated, etc. (See TINSEL—Electric Conductor)

TOOLS—Wire Cutting
Porter, H. K., Inc., Somerville, Mass.

TRAMRAIL SYSTEMS—
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.

TRANSMISSIONS—Variable speed (See Machy—Power Transmission)

TRAVERSES & DRUMS—For Reels (See Drums & Traverses)

TRAVERSE MECHANISMS—
Apco Mossberg Co., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Niles Steel Products Div., Republic Steel Corp. Niles, Ohio
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R.I.
Wire Insulating Machy., Inc., Manchester, Conn.

TUBE BENDERS AND FORMERS—
Kilmer, M. D., & Co., Cleveland, Ohio

TURKS HEADS—
Fenn Manufacturing Co., The, Hartford, Conn.

VALVES & FITTINGS—Acid Resistant
Haveg Corp., Newark, Del.

VARNISHES—for Electric Wire
N. E. Lacquer Co., E. Providence, R. I.
Solar Varnish Corporation, Linden, N. J.

VULCANIZING PANS AND EQUIPMENT
American Insulating Mach'y Co., Phila., Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Wire Insulating Machy., Inc., Manchester, Conn.

WELDERS—Spot and Butt
Eisler Engineering Co., Newark, N. J.
Micro Products Co., Chicago, Ill.

WIRE—Aluminum
Elmet Division, North American Philips Company, Inc., Lewiston, Maine
Malin & Co., Cleveland, Ohio
Seneca Wire & Manufacturing Co., Fostoria, Ohio

WIRE—Barbed
Gerber, J., & Co., Inc., New York, N. Y.
Interlocking Fence Co., Morton, Ill.

WIRE—Brass
American Brass Co., The., Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.

WIRE—Brush
Gerber, J., & Co., Inc., New York, N. Y.

WIRE—Cast
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Cold Heading
American Steel & Wire Co., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Erie Iron & Supply Corp., Erie, Pa.
Gerber, J., & Co., Inc., New York, N. Y.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's John A., Sons Co., Trenton, N. J.
Seneca Wire & Manufacturing Co., Fostoria, Ohio
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Copper
American Brass Co., The, Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Gerber, J., & Co., Inc., New York, N. Y.

WIRE—Flat, Fine
Anchor Wire Corp., Jamaica, L. I., N. Y.
Elmet Division, North American Philips Company, Inc., Lewiston, Maine
Gerber, J., & Co., Inc., New York, N. Y
Montgomery Co., The, Windsor Locks, Conn.

WIRE—Forming
Art Wire and Stamping Co, Newark, N. J.
Erie Iron & Supply Corp., Erie, Pa.
Pittsburgh Cut Wire Co., Pittsburgh, Pa.

WIRE—Galvanized
Erie Iron & Supply Corp., Erie, Pa.
Gerber, J., & Co., Inc., New York, N. Y.

WIRE—Manufacturers
American Steel & Wire Co., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Continental Steel Corp., Kokomo, Ind.
Gerber, J., & Co., Inc., New York, N. Y.
Johnson Steel & Wire Co., Worcester, Mass.
Keystone Steel & Wire Co., Peoria, Ill.
Newbury Co., The, Boston, Mass.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Co., Trenton, N. J.
Seneca Wire & Manufacturing Co., Fostoria, Ohio
U. S. Steel Co., N. Y., N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Music
American Brass Co., The, Waterbury, Conn.
American Steel & Wire Co., Cleveland, Ohio
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Malin & Co., Cleveland, Ohio
Newbury Co., The, Boston, Mass.
Seneca Wire & Manufacturing Co., Fostoria, Ohio
Specialty Wire Co., Inc., Worcester, Mass.

WIRE—Nickel Silver and Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
Malin & Co., Cleveland, Ohio.
Chase Brass & Copper Co., Waterbury, Conn.

WIRE—Oil Tempered
Pittsburgh Steel Co., Pittsburgh, Pa.

WIRE—Spring
American Brass Co., The, Waterbury, Conn.
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Erie Iron & Supply Corp., Erie, Pa.
Gerber, J., & Co., Inc., New York, N. Y.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Keystone Steel & Wire Co., Peoria, Ill.
Newbury Co., The, Boston, Mass.
Pittsburgh Steel Co., Pittsburgh, Pa.
Seneca Wire & Manufacturing Co., Fostoria, Ohio
Specialty Wire Co., Inc., Worcester, Mass.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Stainless Steel
American Steel & Wire Co., Cleveland, Ohio
Firth Sterling, Inc., Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Specialty Wire Co., Inc., Worcester, Mass.
Wire Corporation, Worcester, Mass.

WIRE—Steel—Also Coppered and Galvanized Steel
Anchor Wire Corp., Jamaica, L. I., N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Erie Iron & Supply Corp., Erie, Pa.
Gerber, J., & Co., Inc., New York, N. Y.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Seneca Wire & Manufacturing Co., Fostoria, Ohio
U. S. Steel Export Co., New York, N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Straightening and Cutting
Art Wire and Stamping Co., Newark, N. J.
Erie Iron & Supply Corp., Erie, Pa.
Pittsburgh Cut Wire Co., Pittsburgh, Pa.
Wickwire Brothers, Inc., Cortland, N. Y.

WIRE—Tungsten
North American Philips Co., Inc., Allied Products Division, New York, N. Y.

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

WRAPPING PAPER—Creped (See PAPER—Creped Wrapping)

YARNS & TAPES—
Glass Fibers, Inc., Toledo, Ohio

YARN TESTERS—
Heineman Corp., Oscar, Chicago, Ill.
Scott Testers, Inc., Providence, R. I.

INDEX Covering the Principal Subjects and Articles Which Appeared in Volume 27 of WIRE AND WIRE PRODUCTS from January to December, 1952, Inclusive

ACSR Wire by F. R. Weise, Jr. 1023
Alloy Additions to the Galvanizing Bath 575
Aluminum Conductor Connectors 1297
Aluminum Wire, Drawing of 676
Aluminum Wire, Effect of Heating on Properties of 255
Annealing Non Ferrous Wire 370
Annealing Silver Wire 1291
Beryllium Copper Wire:
Part I: Its Processes and Uses by J. T. Richards 149
Part II: Property and Design Considerations 257
Blending of Vinyl Extrusion Compounds, Dry 1043
Brass and Copper Wire, Production of 1178
Brass, Effect of Impurities in Free Cutting 1027
Bunched Copper Wire for Electrical Conductors by Howard H. Allen 1175
Cable Coverings, Neoprene 351
Cable and Wire Insulator, Teflon as a 579
Cable Installations in Chemical Plants by V. Siegfried and W. P. Lewis 881
Cable Knitting and Its Advantages by V. L. Pinnock 583
Can Quality Control Be Used in The Wire Mill? by H. H. Passolt 1062
Capped Steels, Characteristics and Applications of 874
Carbide Dies, Method of Determining Profile of 783
Carbide Tools, Grinding Hints for Single Point 478
Characteristics and Applications of Capped and Rimmed Steels by H. H. Smith 874
Chromium-Nickel Stainless Steels, Processing of 1036
Cloth, Wire—Costs in Manufacture of 162
Cleaning of Rods and Wire Mechanically 672
Coating Metal Used in Hot Dip Galvanizing (4 parts) by W. G. Imhoff
Part I—Zinc 356
Part II—Impurities Generally Found in Zinc Slab 469
Part III—Metal and Alloy Additions to the Galvanizing Bath 575
Part IV—Coating Qualities Resulting from Different Galvanizing Bath Compositions 686
Coating Process, New, for Mechanically Descaled High Carbon Wire 473
Cold Pressure Welding of Wire by Edmund D. Sickels 1298
Copper and Brass Wire, Production of 1178
Copper Wire, Bunched 1175
Copper Wire Drawing Solutions, Control of 1032
Copper Wire, Effect of Heating on Properties of 255
Copper Wire, Electrotinning of 464-565
Copper Wire, The Fabrication of 35
Control of Wire Drawing Solutions for Copper, The by R. C. Williams 1032
Copperweld Fine Wire by F. E. Leib 878
Cost Reduction, Organized 1281
Coverings, Neoprene for Wire and Cable 351
Creep and Relaxation of High Strength Steel Wires at Room Temperature by Gordon T. Spare 1058
Crystallography, Use of in Manufacture of Diamond Tools 1288
Cutter for Rods, Wire and Rope 264
Development of Improved Electrical Wiring Materials, The by Vincent McBride 1039
Diamond Tools, Use of Crystallography in Manufacture of 1288
Dies, Method of Determining Profile of Carbide 783
Discussion of Aluminum Conductor Connectors by H. W. Biskeborn 1297
Drawing of Aluminum Wire by J. S. Urbanik 676
Drawing of Weaving Wire by A. S. Knapp 1041
Dry Blending for the Vinyl Extrusion Industry by M. G. Caine 1043
Effect of Certain Impurities on Free Cutting Brass by Grayson B. Wood, Jr. 1027
Effect of Heating at 300° and 500° F. on the Properties of Aluminum and Copper Wires by A. S. Russell 255
Electrical Conductors, Bunched Copper Wire for 1175
Electrical Wiring Materials, Development of Improved 1039
Electrical Insulating Material, Glass Paper as an 1188
Electrical Developments in 1951, (from G. E. Annual Report) 266
Electrotinning Copper Wire: A New Process
Part I: The Process by Dr. F. A. Lowenheim 464
Part II: The Machine by C. O. Bruestele 565
Elongation Tests on Wire, Significance of 1015
Evolution of the Modern Hot-Dip Galvanizing Pot, The by Wallace G. Imhoff 769
Extrusion Compounds, Dry Blending of 1043
Fabrication of Copper Wire, The by Sidney Rolle 35
Fiberglas Yarns—Their Qualities and Applications by P. L. Layton 776
Fine Wire, Copperweld 878
Fifth Annual Wire and Cable Conference, The 786
Fourdrinier Wire Cloth, Manufacture of 249
Galvanizing, Bath Composition 686
Galvanizing, Hot Dip Baths ..... 356, 469, 575 and 686
Galvanizing, Metal and Alloy Additions to Bath 575
Galvanizing Pot, The Evolution of the Hot-Dip 769
Gilbert and Bennett Story, The 167
Government Wire Production Information: 60, 170, 270, 372, 479, 589, 693, 790, 893, 1194 and 1302
Glass Paper as an Electrical Insulating Material by Kenneth J. Busse 1188
Grinding Hints for Single Point Carbide Tools 478
Heat, Effect of on Aluminum and Copper Wires 255
High Carbon Wire, Coating Process for Mechanically Descaled 473
High Price in Principles of Price Control by Politicians by L. S. Hamaker 683
History and Development of Planetary Thread Rolling by Howard D. Prutton 679
Hot-Dip Galvanizing Pot, Evolution of 769
How Will Business Be in 1952? by A. C. Adams
K. R. Beardslee
R. K. Clifford
J. A. Coe, Jr.
A. F. Metz 50
Improved Lime Bath Performance by Recirculation by Jere Y. Heisler 1185
Impurities, Effect of in Free Cutting Brass 1027
Increasing-Load Wire Abrasion Tester, The by H. T. McLean 871
Insulating, Glass Paper as a Material for Electrical 1188
Insulating Material for Wire and Cable—Silicone Rubber 1064
Insulator, Teflon as a Wire and Cable 579
Knitting and Its Advantage, Cable 583
Lime Bath Performance by Recirculating, Improved 1185
Lubricants, Wire Drawing 1180
Magnetic Wire, Processing of Chromium Nickel Stainless Steel 1036
Making Satisfactory Welded Joints in Wire by Resistance Welding by The Technical Staff, Taylor-Winfield Corp. 161
Manufacture and Use of Fourdrinier Wire Cloth, The by A. C. Hose and J. P. Johnson 249
Mechanical Cleaning of Rods and Wire—A Symposium on 672
Metal and Alloy Additions to the Galvanizing Bath 575
Neoprene Wire and Cable Coverings by H. E. Charles 351
New Coating Process for Mechanically Descaled Patented High Carbon Wires, A, by Harold L. Trembicki 473
New Type Cutter Developed for Rods, Wire and Rope by Evans Jasper 264
Nickel-Chromium Stainless Steels, Processing of 1036
Non-Ferrous Division Holds First Session in Waterbury by Edmund D. Sickels 1173
Organized Cost Reduction by Paul V. Crooks 1281
Outstanding Personalities of the Wire Industry ..... 68, 178, 278, 383, 489, 597, 700, 799, 902, 945, 1203 and 1309
Perfect Profile, The—A Yardstick by F. Mortimer 783
Pacific Coast Regional Meeting, 1952 780
Paper, Glass, as an Electrical Insulating Material 1188
Pittsburgh Regional Meeting, 1952 669
Planetary Thread Rolling, History and Development of 679
Plastics, Weathering Characteristics of Polyvinyl Chloride 1053
Polyvinyl Chloride Plastics, Weathering Characteristics of 1053
Production of Brass and Copper Wire by Benjamin H. McGar 1178
Production of Non-Ferrous Wire Annealing at Bridgeport by W. J. Krailing 370
Production of Springs by Statistical Quality Control by E. E. Franks, Jr. 156
Quality Control, Statistical, in Spring Production 156
Quality Control in the Wire Mill 1062
Radial Forces in Wire Ropes by Federico Hruska, H. 459
Recirculation Improves Lime Bath Performance 1185
Resistance Welding, Making Satisfactory Joints by 161
Review of Recent Wire Patents, A 75-185-285-390-498-606-708-811-969-1096-1211-1317

Rimmed Steels, Characteristics and Applications of 874
Rods, Mechanical Cleaning of 762
Rod, Wire and Rope Cutter 264
Rolling Threads, Planetary 679
Ropes, Radial Forces in Wire 459
Rope, Rod and Wire Cutter 264
Rubber, Silicone—an Insulating Material for Wire and Cable 1064
Selection and Processing of Chromium-Nickel Stainless Steels for Magnetic Applications by F. K. Bloom and J. S. White 1036
Setting Wire Tensions with Tension Meters by Dr. Erwin J. Saxl 584
Significance of the Elongation Test on Wire by H. J. Godfrey 1015
Silicone Rubber: A New Insulating Material for Wire and Cable by M. G. Noble 1064
Silver Wire—Its Cold Working and Annealing by M. Baliki 1291
Solutions, Control of Copper Wire Drawing 1032
Springs, Statistical Quality Control in Production of.... 156
Stainless Steels, Chromium-Nickel—Processing of 1036
Standard Costs in Wire Cloth Manufacture by W. S. Hildebrand 162
Statistical Quality Control in Spring Production 156
Steel Wire, Creep and Relaxation of High Strength.... 1058
"Teflon" Tetrafluoroethylene Resin as a Wire and Cable Insulator by B. E. Ely 579
Tension Meters, Setting of Tensions with 584
Tester, Increasing Load Wire Abrasion 871
Tests, Elongation on Wire 1015
Thread Rolling, Planetary — History and Development of 679
Use of Crystallography in the Development and Manufacture of Diamond Tools by G. E. Shubrooks and H. P. Gifford 1288
Vinyl Extrusion Compounds, Dry Blending of 1043
Weathering Characteristics of Polyvinyl Chloride Type Plastics by J. G. Hendricks and E. L. White 1053
Weaving Wire, Drawing of 1041
Welding, Cold Pressure, of Wire 1298
Welding, Resistance—Making Satisfactory Joints by 161
What are the Differences in Wire Drawing Lubricants? by Leon Salz 1180
Wire Abrasion Tester, Increasing Load 871
Wire, ACSR 1023
Wire, Aluminum and Copper, Effect of Heating on Properties of 255
Wire, Aluminum, Drawing of 676
Wire Annealing, Non-Ferrous 370
Wire as a Material for Product Fabrication by P. F. Titchener 362
Wire Association—Convention Program ...884-887-1065-1070
Wire Association—Non-Ferrous Regional Meeting at Waterbury 1173
Wire Association—Pacific Coast Regional Meeting 780
Wire Association—Pittsburgh Regional Meeting 669
Wire Association—Proceedings of the October, 1951 Convention 51
Wire, Beryllium .....149 and 257
Wire, Brass and Copper—Production of 1178
Wire, Bunched Copper, for Electrical Conductors..... 1175
Wire and Cable Conference, The Fifth Annual 786
Wire and Cable Coverings, Neoprene 351
Wire and Cable Insulator, Teflon as a 579
Wire and Cable, Silicone Rubber—An Insulating Material for 1064
Wire Cloth, Fourdrinier—Manufacture of 249
Wire Cloth, Standard Costs in Manufacture of 162
Wire, Cold Pressure Welding of 1298
Wire, Copper—The Fabrication of 35
Wire Creep and Relaxation of High Strength 1058
Wire Drawing Lubricants, Differences in 1180
Wire, Drawing of Weaving 1041
Wire Drawing Solutions, Control of 1032
Wire, Electrotinning of Copper .....464 and 565
Wire, Fine—Copperweld 878
Wire, High Carbon—Coating Process for Mechanically Descaled 473
Wiring Materials, Development of, Improved Electrical 1039
Wire, Mechanical Cleaning of 672
Wire Mill, Quality Control in 1062
Wire Outlook, The 33-147-247-349-457-563-667-767-869-1007-1279
Wire Product Fabrication 362
Wire Rope, Radial Forces in 459
Wire, Silver—Its Cold Working and Annealing 1291
Wire Tensions, Setting of with Tension Meters..... 571
Wire Tests, Elongation 1015
X-Ray Helps Produce Better Wire by New Methods Which Analyze Crystal Structure of Base Metals by J. Buhler 571
Yarns, Applications and Qualities of Fiberglas 766
Ye Colonial Wyar Trade 366
Your Company is "Exhibit A" to Your Employees by Fred Rudge 889
Zinc, for Galvanizing 356
Zinc Slab Impurities 469

AUTHORS—Contributing the Leading Articles to WIRE AND WIRE PRODUCTS During the Year, 1952

ADAMS, AVERY C., President
Pittsburgh Steel Company
Pittsburgh, Pennsylvania

ALLEN, HOWARD H., President
Nonotuck Manufacturing Company
Holyoke, Massachusetts

BALDRIDGE, WILLIAM M.,
Research Engineer
Laclede Steel Company
Alton, Illinois

BALIKI, M., Dr. Ing.
Professor of Metallurgical Engineering
Polytechnic Institute of Brooklyn
Brooklyn, New York

BEARDSLEE, K. R., President
Carboloy Department of
General Electric Company
Detroit, Michigan

BISKEBORN, H. W., Technical Director
Kaiser Aluminum and Chemical Corporation
Newark, Ohio

BLOOM, F. K.
Research Metallurgist
Armco Steel Corporation
Baltimore, Maryland

BRUESTLE, C. O.
Director of Engineering
Syncro Machine Company
Perth Amboy, New Jersey

BUHLER, JOHN
Research and Control Instruments Division
North American Philips Company, Inc.
New York, New York

BUSSE, KENNETH J., Sales Manager
Micro-Fiber Division
Glass Fibers, Inc.
Toledo, Ohio

CAINE, M. G., Assistant Sales Manager
Vinyl Resins Dept., Plastic Division
Monsanto Chemical Company
Springfield, Massachusetts

CHARLES, HENRY E., Research Engineer
The Okonite Company, Hazard Division
Wilkes-Barre, Pennsylvania

CLIFFORD, RALPH K., President
Continental Steel Company
Kokomo, Indiana

COE, JOHN A., JR., President
The American Brass Company
Waterbury, Connecticut

CROOKS, PAUL V.
Works Industrial Engineer
Newburgh Works
American Steel and Wire Division
United States Steel Company
Cleveland, Ohio

ELY, BERTREN E., Products Specialist
Polychemicals Department
E. I. DuPont de Nemours & Company
Wilmington, Delaware

FRANKS, EDWARD E., JR.
Engineer in Charge, Spring Machinery
The Torrington Manufacturing Company
Torrington, Connecticut

GIFFORD, H. P.
Supervisor, Crystal Tool Laboratory
Hamilton Watch Company
Lancaster, Pennsylvania

GODFREY, HOWARD J., Assistant Chief Engineer
Research and Development
John A. Roebling's Sons Company
Trenton, New Jersey

HAMAKER, L. S.
Assistant General Sales Manager
Republic Steel Corporation
Cleveland, Ohio

HEISLER, JERE Y., Assistant General Foreman
Wire Drawing Department
Bethlehem Steel Company
Sparrows Point, Maryland

HENDRICKS, J. G.
National Lead Company Research Laboratories
Brooklyn, New York

HILDEBRAND, W. S., Chief Accountant
Mt. Wolf Plant
American Wire Fabrics Corporation
Mount Wolf, Pennsylvania

HOSE, A. G.
The Lindsay Wire Weaving Company
Cleveland, Ohio

HRUSKA H., FEDERICO
Madeco
Santiago, Chile

IMHOFF, WALLACE G., President
The Wallace G. Imhoff Company
North Highlands, California

JASPER, EVANS, Vice President and General Manager
Manco Manufacturing Company
Bradley, Illinois

JOHNSON, J. P.
The Lindsay Wire Weaving Company
Cleveland, Ohio

KNAPP, ALBERT S.
Vice President and Chief Engineer
G. F. Wright Steel and Wire Company
Worcester, Massachusetts

KRAILING, W. J., Furnace Engineer
Bridgeport Brass Company
Bridgeport, Connecticut

LAYTON, PAUL L.
Owens-Corning Fiberglas Corporation
Pacific Coast Division
Los Angeles, California

LEIB, F. E., Chief Electrical Engineer
Copperweld Steel Company
Glassport, Pennsylvania

LEWIS, WALTON P., Engineer
Electrical Cable Works
American Steel and Wire Division
United States Steel Company
Worcester, Massachusetts

LOWENHEIM, FREDERICK A.
Metal and Thermit Corporation
Rahway, New Jersey

McBRIDE, VINCENT, Chief Engineer
Plastic Wire and Cable Corporation
Jewett City, Connecticut

McGAR, BENJAMIN H.
Director, Metallurgical Department
Chase Brass and Copper Company
Waterbury, Connecticut

McLEAN, H. T.
Material and Processing Division
General Engineering Laboratory
General Electric Company
Schenectady, New York

MFTZ, A. F., President
Okonite Company
Passaic, New Jersey

MORTIMER, FRANCES, B. A.
The British Iron and Steel Research Association
London, England

NOBLE, M. G., Application Engineer
Silicone Products Department
General Electric Company
Waterford, New York

PASSOLT, HENRY H., Chief Metallurgist
Johnson Steel and Wire Company
Worcester, Massachusetts

PINNOCK, VERNON L.
Southport, Lancastershire, England

PRUTTON, HOWARD D.
D. H. Prutton Machinery Company
Cleveland, Ohio

RICHARDS, JOHN T., Development Engineer
The Beryllium Corporation
Reading, Pennsylvania

ROLLE, SIDNEY, Assistant Manager
The Scomet Company
New York, New York

RUDGE, FRED
Fisher, Rudge and Neblett
New York, New York

RUSSELL, ALLEN S.
Aluminum Research Laboratories
New Kensington, Pennsylvania

SALZ, LEON, Manager,
Lubricants Division
Magnus Chemical Company, Inc.
Garwood, New Jersey

SAXL, DR. ERWIN J.
Saxl Instrument Company
Harvard, Massachusetts

SHUBROOKS, G. E., Manager of Research
Hamilton Watch Company
Lancaster, Pennsylvania

SICKELS, EDMUND D., Editor
Wire and Wire Products
Stamford, Connecticut

SIEGFRIED, VICTOR, Chief Research Engineer
Electrical Cable Works
American Steel and Wire Division
United States Steel Corporation
Worcester, Massachusetts

SMITH, H. H.
Assistant Manager, Metallurgical Department
American Steel and Wire Division
United States Steel Corporation
Cleveland, Ohio

SPARE, GORDON T., Research Engineer
American Steel and Wire Division
United States Steel Corporation
Cleveland, Ohio

TITCHENER, PAUL F., President
E. H. Titchener and Company
Binghamton, New York

TREMBICKI, HAROLD L.
Harold L. Trembicki Company
Chicago, Illinois

URBANIK, J. S., Plant Superintendent
Kaiser Aluminum & Chemical Corporation
Newark, Ohio

WEISE, FRANK R., JR.
Rod and Wire Mills
Detroit Steel Corporation
Portsmouth Division
Portsmouth, Ohio

WHITE, E. L.
National Lead Company Research Laboratories
Brooklyn, New York

WILLIAMS, ROBERT C.
Director of Research
The Ironsides Company
Columbus, Ohio

WOOD, GRAYSON B., JR., Metallurgist
Scovill Manufacturing Company
Waterbury, Connecticut

Time Grows Short . . .

Last Call for Copy for
the 1953 Edition of the
WIRE AND WIRE PRODUCTS
BUYERS' GUIDE!

To those wire manufacturers of wire and those suppliers to the wire industry who have not yet placed space orders and sent copy for this 1953 Edition, we urge your prompt action in order that you may be properly represented with advertising.

Our BUYERS' GUIDE, a directory for the wire industry, is an important reference book. The new edition will be bigger than ever and contains hundreds of changes and additions.

Please write for rates.
Forms close January 24,
1953 for advertising.

WIRE AND WIRE PRODUCTS
453 MAIN STREET STAMFORD, CONN.

The WATSON MACHINE COMPANY

ESTABLISHED 1845

PATERSON 3, NEW JERSEY, U. S. A.

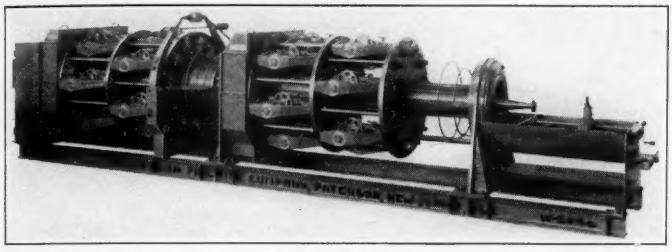
ELECTRICAL WIRE AND CABLE, WIRE ROPE, CORDAGE AND MASTICATING MACHINERY MANUFACTURERS

WATSON

STRANDING HEADS

PATENTS AND PATENTS PENDING

BACKED BY MANY YEARS OF EXPERIENCE AND CONSTANT EFFORT, WE OFFER SUPERIOR MACHINES WHICH MEET ALL REQUIREMENTS, OF WHICH THE FEW SHOWN HERE ARE EXAMPLES.

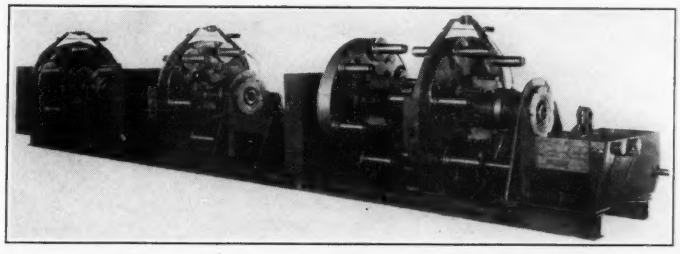


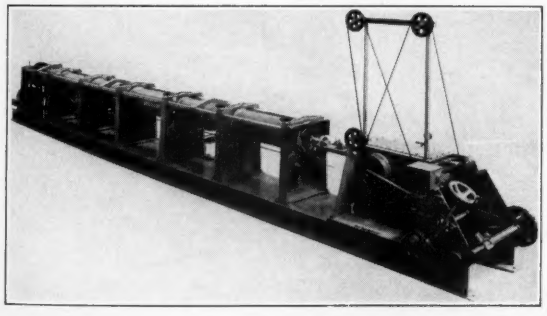
TYPE "PH/GB" SERIES 1500—PLANETARY

No. W-2414a. FOR 24-12" SPOOLS. "SHAFTLESS", INTEGRAL FRICTION, NO-LOOSE-PART CRADLE ELIMINATE SPOOL SLAP. VARIABLE GEARED BACK-TURN. FOR HEAVIEST DUTY. COMPLETELY BALL BEARING. AVAILABLE IN 12 SIZES AND COMBINATIONS.

TYPE "RH"—RIGID FRAME

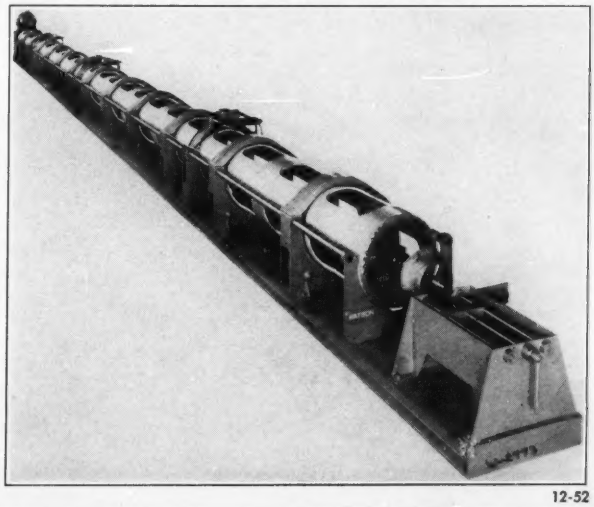
No. W-3933. 6, 12 and 18 SPOOL HEADS FOR 22" SPOOLS. MOUNTED ON COMMON BASE FOR 37 WIRE STRAND PRODUCTION IN ONE PASS AND TO 127 WIRE STRAND PRODUCTION BY MULTI-PASS. PRODUCES ROUND AND SECTOR, COPPER AND ALUMINUM STRANDS AT HIGHEST SPEED AND LOWEST COST. AVAILABLE IN 24 SIZES AND COMBINATIONS.





TYPE "VL"—EXTRA HIGH SPEED—TUBULAR

No. W-4144-46. COMPLETE 12 — 7" SPOOL MACHINE, 1800 R.P.M. "SHAFTLESS", NO-LOOSE-PART, AUTOMATIC LOCK CRADLES. HIGHEST PRODUCTION RECORDS. SAFE AND QUIET. AVAILABLE IN 24 SIZES AND COMBINATIONS.



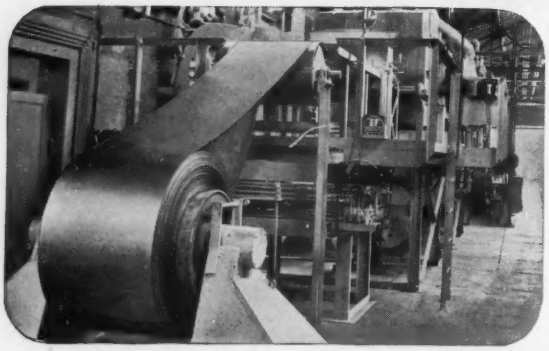
TYPE "TH"—HIGH SPEED—TUBULAR

No. W-2773. 25—22" SPOOL HEAD, 435 R.P.M. SOLID BOX BASE. ONE-HAND SELF-LOCKING BOAT CRADLES. SINGLE SPIDERS. ALL STEEL ROTOR. AUTOMATIC SPRING SET BRAKES. THE INDUSTRY'S STANDARD FOR MANY YEARS. AVAILABLE IN 38 SIZES AND COMBINATIONS.

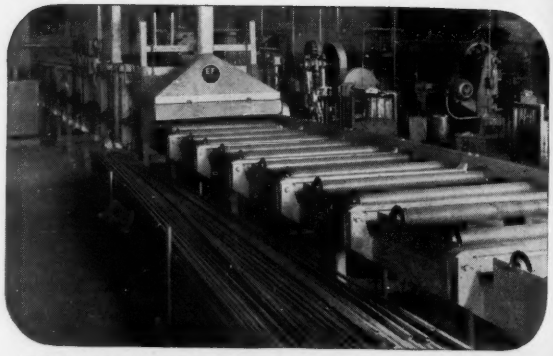
▼ ▼ ▼

Descriptive Literature Available On All Head Types And On Capstans, Takeups And Other Auxiliaries.

12-52



EF CONTINUOUS STRIP LINES — for annealing, galvanizing, aluminizing, etc. This combination gas-fired and electric unit provides flexibility in controlled heating, soaking and cooling, for producing various surface and metallurgical conditions on ferrous and nonferrous strip. Built by The Electric Furnace Co., Salem, Ohio.



EF CONTINUOUS FURNACES are built in many sizes and types for processing wire, sheet, castings, stampings, strip, tubing and many other products. This EF gas-fired radiant tube special atmosphere furnace bright normalizes 3000 lbs. steel tubing per hour. Built by The Electric Furnace Co., Salem, Ohio.

EF builds Gas-Fired, Oil-Fired and Electric Furnaces for these and other heat treating operations

● EF engineers specialize in designing and building production furnaces — continuous and batch types — including roller hearth, roller rail, chain belt, wire belt, slot and tube conveyor types, reciprocating, rotary, car, bell, pit and other designs; complete with special atmosphere producers, and time and labor saving material handling equipment as required.

Reflecting more than 30 years of continuous research and experience, and outstanding engineering accomplishments, EF furnaces combine high heating efficiency, accurate automatically controlled cycles, and advanced designs that minimize maintenance, assure economy of operation, high hourly output and uniformity of product.

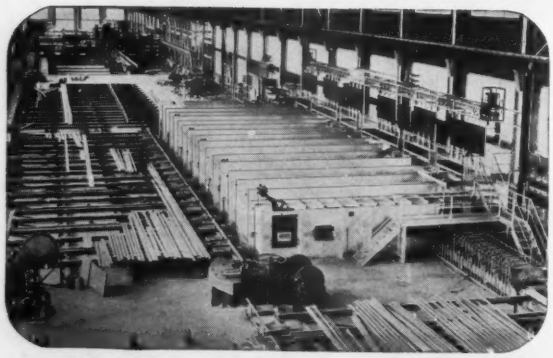
Submit your production furnace problems to ***experienced engineers — it pays.***

AGING
ANNEALING
ALUMINIZING
BRAZING
CARBON RESTORATION
CARBURIZING
CERAMIC DECORATING
DRAWING
GALVANIZING
HARDENING
HOMOGENIZING
MALLEABLIZING
NORMALIZING
NITRIDING
SINTERING
SOLUTION TREATING
SPECIAL ATMOSPHERE TREATMENTS AND OTHER PROCESSES

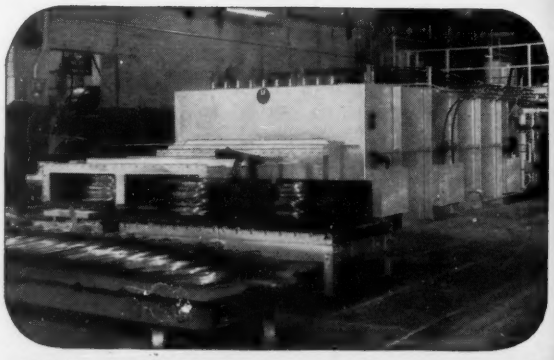
THE ELECTRIC FURNACE CO. *Salem - Ohio*

GAS FIRED, OIL FIRED AND ELECTRIC FURNACES FOR ANY PROCESS PRODUCT OR PRODUCTION

Canadian Associates ● CANEFCO LIMITED ● Toronto 1, Canada



LARGE STRUCTURAL SHAPES up to 90 feet in length are automatically charged into this furnace, carried across the 93 ft. x 26 ft. heating chamber, uniformly heated and discharged thru a spray quench — everything is automatic. Built by The Electric Furnace Co., Salem, Ohio.



BRIGHT ANNEALING WIRE. An EF continuous bright annealing furnace in which the wire is conveyed through the various zones on two parallel rows of bulkhead type trays. This unit has convection cooling and handles 2500 net lbs. of wire per hour. Built by The Electric Furnace Co., Salem, Ohio.